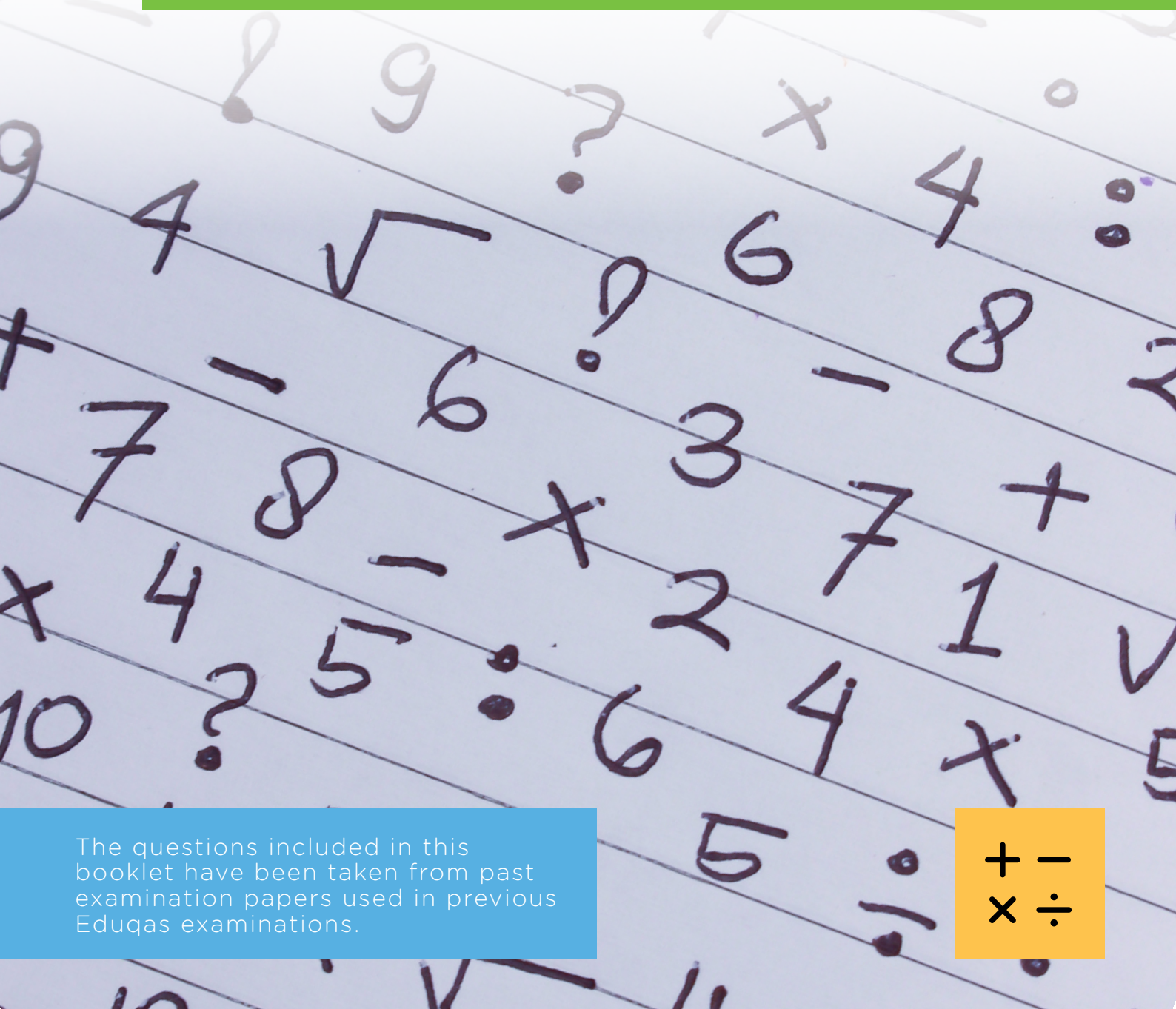
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Eduqas GCSE Mathematics Higher Tier

Number, Ratio and Proportion Revision Booklet



The questions included in this booklet have been taken from past examination papers used in previous Eduqas examinations.

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Please note that any questions labelled as “Calculator” have been taken from an exam paper where the use of a calculator was allowed. This does not necessarily mean that a calculator is required to answer the question.

Estimation: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	1	
#2	1	
#3	3	
Total	5	

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#1

(a) Jo estimates the value of $2{\cdot}75^4$ to be less than 81.

Show that Jo is correct. [1]

.....

.....

.....

.....

.....

Question taken from Eduqas examination paper 530003, November 2018

#2

(a) Estimate the value of $\sqrt[5]{33}$. [1]

.....

.....

Question taken from Eduqas examination paper 530003, November 2021

#3

Estimate the value of $\dfrac{2{\cdot}01^3 \times \sqrt{98{\cdot}5}}{0{\cdot}195}$. [3]

.....

.....

.....

.....

Question taken from Eduqas examination paper 530003, May 2024

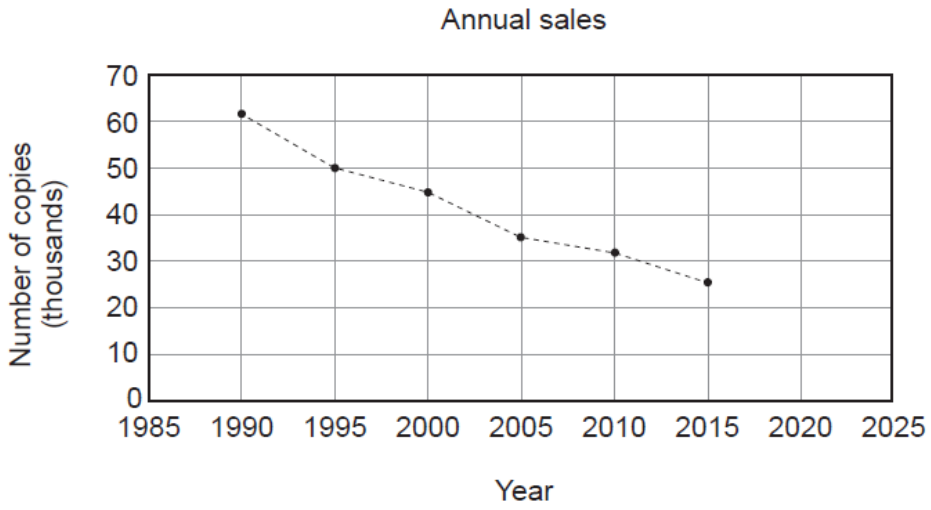
Estimation: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
Total	3	

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#1

The graph shows the number of copies of a local newspaper sold over a 25-year period.



(a) Eva uses the graph to predict that about 10 thousand newspapers will be sold in 2025.

Explain why her prediction may not be reliable. [1]

.....

.....

(b) The ratio of adults who read news online to those who do not is 16 : 9.
The adult population of the UK is about 52 000 000.

Calculate an estimate of the number of adults in the UK who read news online. [2]

.....

.....

.....

.....

Question taken from Eduqas examination paper 530004, November 2020

Calculating with the Four Operations: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	6	
Total	6	

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#1 Huw has a maths test.

(a) For the first question, Huw divides 752 by a whole number.
His answer, which is correct, is 25 remainder 27.

What whole number did Huw divide by? [3]

(b) The second question is:

> The only food provided for guests at Seaview Hotel is breakfast. The hotel has enough food to make breakfast for 20 guests for 6 days.
> How long would the food last 30 guests?
> You may assume each guest eats the same amount of food for breakfast.

Here is Huw's working.



(i) Without working out the correct answer, explain why Huw's answer of 9 days is incorrect. [1]

(ii) Work out the correct answer. [2]

..... days

Question taken from Eduqas examination paper 530003, November 2019

Using a Calculator: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	4	
Total	6	

created with

eduqas Part of WJEC Question Bank

#1

In an experiment it is found that $C = \frac{2340}{B}$ and $A = \frac{52}{\sqrt{B}}$.

Find the value of C when $A = 130$. [2]

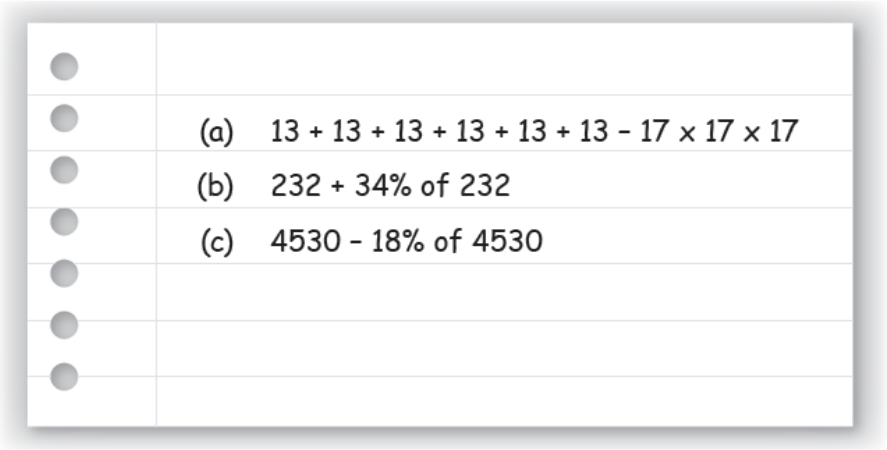
Question taken from Eduqas examination paper 530004, June 2018

#2

Harman has written some calculations he needs to work out for his homework.

Write down the calculation needed to work out each of the following using the fewest number of key presses. [4]

Give your answer to each question.



(a) .....

.....

.....

.....

Answer: .....

(b) .....

.....

.....

.....

Answer: .....

(c) .....

.....

.....

.....

Answer: .....

Question taken from Eduqas examination paper 530004, June 2019

Fractions / Percentages as Operators: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

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#1

Huw is paid a weekly wage.

Every week he:

- saves $\frac{1}{5}$ of his wage,
- spends 70% of the money **he has left** on his living expenses,
- spends all that remains on his social life.

(a) One week, Huw saves £40.

How much does Huw spend on his social life? [3]

(b) What percentage of his weekly wage does Huw spend on his social life? [2]

Question taken from Eduqas examination paper 530003, June 2019

Calculating with Fractions: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	4	
Total	7	

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#1

Work out $2\frac{3}{4} \div \frac{5}{8}$.

Give your answer as a mixed number in its simplest form. [3]

Question taken from Eduqas examination paper 530003, November 2020

#2

Shania has two pieces of ribbon.

One piece is $5\frac{1}{4}$ metres long.

The difference between the lengths of the two pieces is $2\frac{9}{20}$ metres.

Work out the **two** possible lengths of the other piece of ribbon.
Give each of your answers as a mixed number in its simplest form. [4]

Question taken from Eduqas examination paper 530003, November 2019

Reverse Percentages: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	3	
#3	3	
Total	8	

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#1

(a) The price of an item in a sale has been reduced by 25%.
If the sale price is £54, what was the original price of the item? [2]

Question taken from Eduqas examination paper 530003, June 2024

#2

Deena sells a painting for £8690.
This is 10% more than she originally paid for it.

How much did Deena pay for the painting? [3]

Question taken from Eduqas examination paper 530003, May 2022

#3



In a sale, jewellery is reduced in price by 40%.
The price of a ring is reduced to £1008 in the sale.

What was the price of the ring before the sale? [3]

Question taken from Eduqas examination paper 530003, November 2022

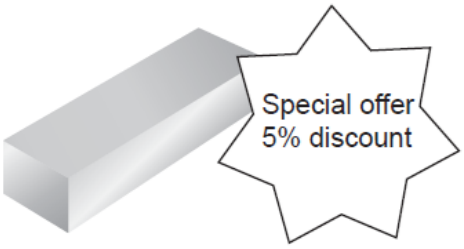
Reverse Percentages: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	4	
Total	7	

created with
eduqas Part of WJEC Question Bank

#1

Bjorn is a jewellery maker.



(a) He pays £1451.60 for a silver bar after a 5% discount has been applied.
What was the original cost of the silver bar? [3]

Question taken from Eduqas examination paper 530004, November 2023

#2

In a sale the prices of all jackets are reduced by 22%.
In the final week of the sale, all jackets are reduced by a further 15% of the sale price.



Abigail buys a jacket in the final week of the sale for £42.50.

What was the original price of the jacket?
Give your answer correct to the nearest penny. [4]

Question taken from Eduqas examination paper 530004, June 2018

Percentage Difference: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	2	
#3	3	
Total	7	

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#1

(a) Emma buys a car for £6500.
She later sells it for £5720.

Calculate her percentage loss.



[2]

Question taken from Eduqas examination paper 530004, November 2020

#2

Nathan and Lucy make and sell wooden items for gardens.

(b) Lucy makes and sells planters.
Each planter costs Lucy £32 to make.
Each one that she sells makes a **profit** of £80.



What is Lucy's profit from the sale of one planter as a percentage of the cost to make the planter?

[2]

Question taken from Eduqas examination paper 530004, November 2022

#3

(a) In 2015, the average price of coal sold by a mine in the USA was $31.83 per ton.
This coal was then delivered to power stations.
The power stations paid $42.58 per ton for this coal.
The difference in price was the delivery cost.

What percentage of the original price of the coal was this delivery cost?
Give your answer correct to 3 significant figures. [3]

Question taken from Eduqas examination paper 530004, November 2019

Converting Between a Recurring Decimal and a Fraction: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	2	
#3	2	
#4	3	
#5	3	
#6	5	
#7	5	
#8	5	
#9	5	
Total	32	

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#1

(d) Write $0{\cdot}0\dot{8}\dot{3}$ as a fraction. [2]

Question taken from Eduqas examination paper 530003, November 2021

#2

Write $7{\cdot}\dot{3}4\dot{1}$ as a fraction. [2]

Question taken from Eduqas examination paper 530003, November 2020

#3

Express $0{\cdot}3\dot{4}\dot{5}$ as a fraction. [2]

Question taken from Eduqas examination paper 530003, November 2023

#4

Write $3\dot{2}\dot{1}$ as a fraction.
Give your answer as a mixed number in its simplest form. [3]

Question taken from Eduqas examination paper 530003, May 2023

#5

(a) Write $\frac{1}{22}$ as a recurring decimal. [1]

(b) Write $5\dot{2}5\dot{8}$ as a fraction. [2]

Question taken from Eduqas examination paper 530003, June 2018

#6

(a) As part of a multiple-choice examination, students were asked the following question:

Evaluate $0{\cdot}20\dot{4}\dot{5} - 0{\cdot}003$

Choose the correct answer from the following:

A	B	C	D	E
$0{\cdot}20\dot{1}\dot{5}$	$0{\cdot}201\dot{5}$	$0{\cdot}20\dot{4}\dot{5}$	$0{\cdot}2015\dot{4}$	$0{\cdot}2015\dot{1}$

Derek chose **A**.
Is he correct?

Yes ☐ No ☐

Give calculations to support your answer. [2]

(b) Express $0{\cdot}\dot{1}2\dot{3}\dot{4}$ as a fraction.
Give your answer in its simplest form. [3]

Question taken from Eduqas examination paper 530003, November 2024

#7

(a) Write $\frac{5}{12}$ as a recurring decimal. [1]

(b) (i) Write $1\cdot2\dot{7}$ as an improper fraction. [2]

(ii) Hence calculate $(1\cdot2\dot{7})^2$, giving your answer as a mixed number in its simplest form. [2]

Question taken from Eduqas examination paper 530003, November 2018

#8

(a) Write $\frac{1}{27}$ as a recurring decimal. [1]

(b) By writing $1{\cdot}2\dot{4}\dot{3}$ as a fraction, calculate $1{\cdot}2\dot{4}\dot{3} - \frac{8}{9}$.

Give your answer as a fraction. [4]

Question taken from Eduqas examination paper 530003, May 2022

#9

(a) Write $\frac{9}{55}$ as a recurring decimal. [1]

(b) Write $3\cdot\dot{7}1\dot{2}$ as a fraction. [2]

(c) Use the fact that $0\cdot0\dot{5} = \frac{1}{18}$ to write $0\cdot2\dot{5}$ as a fraction. [2]

Question taken from Eduqas examination paper 530003, November 2022

Rules of Indices: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	2	
#3	3	
#4	4	
#5	5	
#6	5	
#7	5	
#8	5	
#9	5	
#10	7	
#11	9	
Total	52	

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#1

(a) Evaluate $27^{\frac{2}{3}}$. [2]

.....

.....

.....

.....

Question taken from Eduqas examination paper 530003, November 2024

#2

(a) Evaluate $8^{\frac{5}{3}}$. [2]

.....

.....

.....

.....

Question taken from Eduqas examination paper 530003, November 2023

#3

(b) Work out the value of $6+\sqrt[3]{8000}$. [1]

.....

.....

(c) Work out the value of $3^{20} \div 3^{18}$. [2]

.....

.....

Question taken from Eduqas examination paper 530003, November 2021

#4

(b) Find the value of each of the following.

(ii) $5^{11} \div 5^{8}$ [2]

(iii) $16^{\frac{3}{4}}$ [2]

Question taken from Eduqas examination paper 530003, November 2018

#5

(a) Write $5^{3} \div 5^{-4}$ as a single power of 5. [1]

(b) Calculate the value of $10\,000^{\frac{3}{4}}$. [2]

(c) Simplify $\sqrt{49 \times 10^{2n}}$. [2]

Question taken from Eduqas examination paper 530003, May 2022

#6

(a) Write $13^{-2} \times 13^{7}$ as a single power of 13. [1]

(b) Calculate the value of $\left(8^{-1}\right)^{\frac{1}{3}}$. [2]

(c) $3^{\frac{5}{a}} = b\sqrt{3}$ where a and b are integers.

Find the value of a and the value of b. [2]

Question taken from Eduqas examination paper 530003, May 2023

#7

(a) Simplify $\frac{x^2 \times x^7}{x^3}$. [2]

(b) (i) Find the positive value of $16^{\frac{1}{4}}$. [1]

(ii) Find the value of $27^{\frac{4}{3}}$. [2]

Question taken from Eduqas examination paper 530003, November 2020

#8

(b) Find the value of $\left(\frac{5}{4}\right)^{-2}$, giving your answer as a decimal. [3]

(c) Find the value of $49^{\frac{3}{2}}$. [2]

Question taken from Eduqas examination paper 530003, November 2021

#9

(a) Find the value of $\left(\frac{1}{5}\right)^{-3}$. [2]

(b) Find the value of $256^{\frac{3}{4}}$. [2]

(c) **Estimate** the value of $50^{\frac{1}{2}}$. [1]

Question taken from Eduqas examination paper 530003, November 2019

#10

(a) Find the value of each of the following.

(i) $9^{-\frac{1}{2}}$ [1]

.....

.....

(ii) $625 \times \frac{5^6}{5^9}$ [2]

.....

.....

(b) Simplify $(2ab^3)^4$. [2]

.....

.....

(c) Estimate the value of $76^{\frac{2}{3}}$. [2]

.....

.....

.....

.....

Estimate .....

Question taken from Eduqas examination paper 530003, June 2018

#11

(a) Find the value of each of the following.

(i) $0{\cdot}8^{-1}$ [1]

(ii) $625^{\frac{1}{4}}$ [1]

(iii) $\left(\frac{1}{64}\right)^{\frac{2}{3}}$ [2]

(b) Write $81\times\frac{3^0}{27^2}$ as a power of 3. [2]

(c) Simplify $\frac{\left(5ab^4\right)^3}{a^2}$. [3]

Question taken from Eduqas examination paper 530003, June 2019

Unit Conversion: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
Total	2	

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#1

(a) Simplify the following ratio, [2]

$15\,cm^2 : 300\,mm^2$

.....

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.....

.....

Question taken from Eduqas examination paper 530003, November 2024

Unit Conversion: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	5	
#3	8	
Total	15	

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#1

(b) In the USA and the UK the word 'ton' means different amounts:

- a UK ton = 1016 kg,
- a USA ton = 907 kg,
- a tonne (called a metric ton in the USA) = 1000 kg.

What is the difference between a UK ton and a USA ton?
Give your answer in tonnes. [2]

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.....

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Question taken from Eduqas examination paper 530004, November 2019

#2

You are given the following:

1 kg ≈ 2·2 pounds 1 pound = 16 ounces

In Keto's restaurant, steak is on the menu.



How much would it cost to order an 8-ounce steak in Keto's restaurant?
You must show all your working. [5]

Question taken from Eduqas examination paper 530004, June 2019

#3

In scientific reports, temperatures are often given using more than one temperature scale.

Celsius, Fahrenheit and kelvin are all measured on linear scales.

Use the information given below to complete the tables.

(a)

Degrees Celsius	Degrees Fahrenheit
30	.....
40	104
50	122
60	.....

[1]

(b)

Kelvin	Degrees Celsius
0	.....
100	.....
200	.....
300	26·85
400	126·85

[2]

(c)

Kelvin	Degrees Celsius	Degrees Fahrenheit
320	.....	.....

[5]

Question taken from Eduqas examination paper 530004, June 2019

Best Buys: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
Total	2	

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#1

A brand of toothpaste is available in two different sizes.

87·5 ml tube costs 49p.
125 ml tube costs 72p.



Which size of toothpaste offers the better value for money?
You must show all your working. [2]

Question taken from Eduqas examination paper 530004, November 2018

Exchange Rates: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	4	
Total	7	

created with
eduqas Part of WJEC Question Bank

#1

In 2019,

- €1 = £0.90,
- $1.25 = £1.



In 2019, a silver pencil cost €110 in Germany.
The same pencil cost $125 in the USA.

In which country was the pencil cheaper?

Germany ☐ USA ☐

You must show all your working. [3]

Question taken from Eduqas examination paper 530003, May 2022

#2

James has been on holiday to the USA and is flying home to the UK.
The price of a gift in a shop at the airport is $65.
The price of the same gift online is €60 including delivery.

On the day of his flight, the exchange rates were as follows.

£0.80 = $1
£1 = €1.20

Is it cheaper to buy the gift at the airport or online?

Airport ☐ Online ☐

Show how you decide. [4]

Question taken from Eduqas examination paper 530003, May 2023

Exchange Rates: Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

created with
eduqas Part of WJEC Question Bank

#1

Abdul is travelling from the UK to Brazil for a holiday.
Abdul has £825 to exchange for Brazilian reals (R$).
The exchange rate is £1 = 6.27R$.
The bank Abdul uses to exchange his money only has 50R$ notes.

What is the maximum amount of Brazilian reals Abdul can buy and what will this cost him in pounds?
Give your answer correct to the nearest penny.
You must show all your working. [5]

Question taken from Eduqas examination paper 530004, June 2024

Product of Prime Factors: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	5	
#4	5	
#5	5	
Total	21	

created with
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#1

(a) Write 882 as a product of its prime factors in index form. [3]

Question taken from Eduqas examination paper 530003, November 2024

#2

(a) $120 = 2^3 \times 3^k \times 5$

Find the value of k. [1]

(b) Write 168 as a product of its prime factors. [2]

Question taken from Eduqas examination paper 530003, June 2019

#3

(a) Write 80 as a product of prime factors using index notation. [3]

(b) $8112 = 2^4 \times 3 \times 13^2$

Find the value of the smallest square number that is a multiple of 8112. [2]

Question taken from Eduqas examination paper 530003, November 2018

#4

(a) Write 2475 as a product of its prime factors in index form. [3]

(b) Write down the square root of $64 \times 5^4 \times 7^4$.
Give your answer as a product of prime factors in index form. [2]

Question taken from Eduqas examination paper 530003, May 2024

#5

(a) Write 378 as a product of its prime factors.
Give your answer in index form. [3]

Product of prime factors in index form .....

(b) Use prime factors to prove that 1 is the only common factor of 378 and 275. [2]

Question taken from Eduqas examination paper 530003, May 2022

LCM / HCF: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	3	
#3	4	
#4	5	
#5	5	
Total	19	

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eduqas Part of WJEC Question Bank

#1

Jamil is taking a group of students on a camping trip.

(a) He buys tins of soup and bottles of water.
He needs to buy the same number of tins as bottles.
Tins of soup are sold in packs of 12 and bottles of water are sold in packs of 15.

What is the smallest number of packs of each that Jamil can buy? [2]

Number of **packs** of soup ..... Number of **packs** of water .....

Question taken from Eduqas examination paper 530003, June 2018

#2

(c) *LoWatts Ltd* makes light bulbs that are identical in size.

They have regular orders from *Company A* for 120 light bulbs and from *Company B* for 168 light bulbs.

LoWatts Ltd uses one size of box to supply both *Company A* and *Company B*.
Each box used contains the same number of light bulbs and is full.
The number of boxes used is as few as possible.

How many light bulbs does each box hold? [3]

Question taken from Eduqas examination paper 530003, June 2019

#3

(b) Two numbers, S and T, have been written as a product of prime factors in index form:

$$S = a^3 \times b \times c^2 \qquad T = a^2 \times b^3 \times c^3$$
$$= a^3bc^2 \qquad = a^2b^3c^3$$

(i) Circle the correct expression for the **highest common factor** of S and T. [1]

abc a^2bc^2 $a^5b^4c^5$ $a^6b^3c^6$ $a^3b^3c^3$

(ii) Circle the correct expression for the **lowest common multiple** of S and T. [1]

abc a^2bc^2 $a^5b^4c^5$ $a^6b^3c^6$ $a^3b^3c^3$

(c) Find the values of p, q and r so that the following is correct. [2]

$$7 \times 10^p + 6 \times 10^q + 8 \times 10^r = 7600 \cdot 008$$

.....

.....

.....

p = ... q = ... r = ...

Question taken from Eduqas examination paper 530003, November 2024

#4

Ivan is part of a team making bags of free items to give away at a college open evening.

He has:

- 140 discount vouchers,
- 56 pencils,
- 280 sweets

to share between all his bags.

He uses **all** the vouchers, **all** the pencils and **all** the sweets.
He makes as many bags as possible.
The contents of each bag are the same.

How many bags does Ivan make and what does each bag contain? [5]

Ivan makes ..... bags containing

..... vouchers, ... pencils, ... sweets.

Question taken from Eduqas examination paper 530003, November 2020

#5

1134 can be written as $2 \times 3^4 \times 7$.

(a) Find the highest common factor of 504 and 1134.
Give your answer as an integer. [4]

Highest common factor of 504 and 1134 = ...

(b) What is the smallest whole number 1134 can be divided by to give a square number? [1]

Question taken from Eduqas examination paper 530003, November 2023

LCM / HCF: Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

created with
eduqas Part of WJEC Question Bank

#1

Gregor owns a restaurant.

(b) Gregor plans to buy some spoons and forks.

A bag of 24 spoons costs £19.95.
A box of 18 forks costs £15.55.
Bags and boxes cannot be split.

Gregor decides to buy the same number of spoons as forks.
He places an order to buy the smallest number of each that he can.

Complete the details on the order form shown at the bottom of the page.
You must show all your working. [5]

Order form	Cost (For the required numbers ordered)
..... bags of spoons	.....
..... boxes of forks	.....
Total cost of the complete order £	

Question taken from Eduqas examination paper 530004, November 2018

Speed / Distance / Time: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

created with
eduqas Part of WJEC Question Bank

#1

(a) Emily walks to school.
She measures her speed, s, as 1·4 metres per second, correct to 1 decimal place.

Write an inequality to show the range of possible values for her speed. [2]

(b) After school, Emily goes to her grandmother's house by car.
It takes 25 minutes to travel the 15 miles.

What is the average speed for the car journey?
Give your answer in miles per hour. [3]

..... mph

Question taken from Eduqas examination paper 530003, November 2021

Speed / Distance / Time: Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	4	
#3	5	
Total	13	

created with
eduqas Part of WJEC Question Bank

#1

Bronny takes part in a triathlon.

In this race she:

- swims 1·5 km in $\frac{3}{4}$ hour,
- cycles at an average speed of 27 km/h for 1 hour and 30 minutes,
- runs 9 km in 1 hour.

The average speed of the winner of the triathlon is 16·1 km/h.

Show that Bronny does not win the race. [4]

Question taken from Eduqas examination paper 530004, June 2022

#2

The speed limit on a road is decreased from 70 mph to 50 mph.
The road is 7·3 miles long.

How much longer does it take to travel along the road at 50 mph than at 70 mph?
Give your answer in minutes correct to 1 decimal place. [4]

Question taken from Eduqas examination paper 530004, November 2020

#3

A car travels at an average speed of 45 mph for 40 minutes.
The next part of the car's journey takes 25 minutes at an average speed of 60 mph.

Show that the average speed of the entire journey is just over 50 mph. [5]

Question taken from Eduqas examination paper 530004, June 2019

Pressure / Force / Area: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	5	
Total	8	

created with
eduqas Part of WJEC Question Bank

#1

(b) Use: $\text{Pressure} = \dfrac{\text{Force (N)}}{\text{Area (cm}^2\text{)}}$

The base of the table has an area of 1600 cm^2.
Some books are also placed on the table.
The books, glass of water and table exert a pressure of 0·1 N/cm^2 on the ground.

Calculate the force exerted on the ground by the books, glass of water and table.
Assume that the whole of the base of the table is in contact with the ground.



Diagram not drawn to scale

[2]

.....

.....

.....

.....

.....

(c) In fact, the assumption made in part (b) is incorrect. Part of the base of the table is not in contact with the ground.

Describe how this changes your answer to part (b). [1]

.....

.....

.....

Question taken from Eduqas examination paper 530003, November 2022

#2

Use:

$$\text{Pressure} = \frac{\text{Force (N)}}{\text{Area (cm}^2\text{)}}$$



A camera is attached to a tripod.
The tripod has 3 legs and stands on horizontal ground.
Each leg exerts the same pressure on the ground.

The tripod has a weight of 34 N.
The camera has a weight of 20 N.

Each foot of the tripod is a rectangle with length 3 cm and width 2 cm.

Work out the pressure exerted by the tripod and camera on the ground.
You must show all your working. [5]

Pressure = ... N/cm^2

Question taken from Eduqas examination paper 530003, November 2020

Pressure / Force / Area: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	4	
#3	4	
Total	11	

created with
eduqas Part of WJEC Question Bank

#1

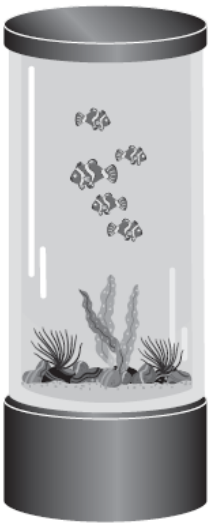
(b) A force of 135 N is applied to an area of 3600 cm^2.

Calculate the pressure.
Give your answer in N/m^2. [3]

Pressure ..... N/m^2

Question taken from Eduqas examination paper 530004, June 2019

#2



Use:

$$\text{Pressure} = \frac{\text{Force}(\text{N})}{\text{Area}(\text{cm}^2)}$$

A cylindrical fish tank stands on horizontal ground.
The base of the fish tank has a radius of 24 cm.
All the base of the fish tank is in contact with the ground.

The fish tank exerts a pressure of 0·97 N/cm^2 on the ground.
What force is exerted on the ground by the fish tank? [4]

Force = ... N

Question taken from Eduqas examination paper 530004, June 2024

#3

Use:

$$\text{Pressure} = \frac{\text{Force (N)}}{\text{Area (cm}^2\text{)}}$$



The base of a filing cabinet is a rectangle. It measures 45 cm by 60 cm.
The whole of the base is in contact with the horizontal ground.

(a) The empty filing cabinet exerts a force of 675 N on the ground.

What is the pressure exerted on the ground by the empty filing cabinet?
Give your answer in N/cm^2. [2]

(b) When the filing cabinet is full, the pressure it exerts on the ground is 0·75 N/cm^2.

What is the force that the full filing cabinet exerts on the ground?
Give your answer in newtons (N). [2]

Question taken from Eduqas examination paper 530004, June 2023

Density / Mass / Volume: Non-Calculator

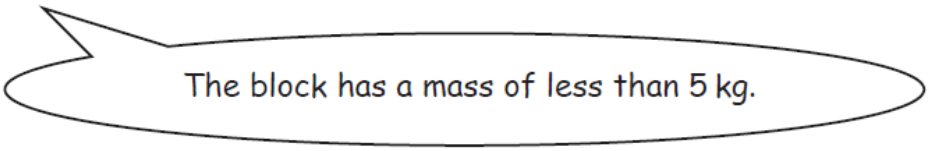
Question	Maximum Mark	Mark Awarded
#1	3	
#2	5	
Total	8	

created with
eduqas Part of WJEC Question Bank

#1

Izaan has a block of stainless steel with volume 700 cm^3.
The stainless steel has a density of 7·5 g/cm^3.

Izaan says,



Is Izaan correct? [3]

☐ Yes ☐ No ☐ Cannot tell

Show how you decide.

Question taken from Eduqas examination paper 530003, November 2023

#2

A small tank is a cuboid. It has a square base of side 20 cm.
The tank contains some liquid but is not full.

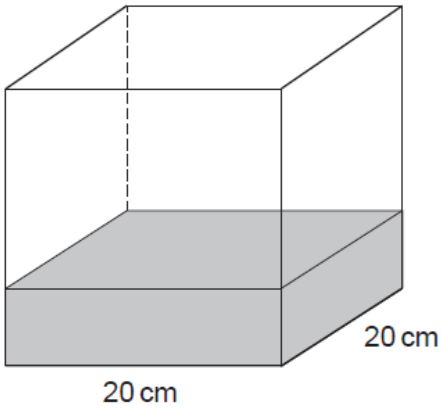


Diagram not drawn to scale

More of the same type of liquid is added to the tank:

- The total mass of the liquid in the tank is now 5400 grams.
- The depth of the liquid has increased by 50%.
- The density of the liquid is 0·9 g/cm^3.

Calculate the **original** depth of the liquid.
You must show all your working. [5]

Question taken from Eduqas examination paper 530003, May 2023

Density / Mass / Volume: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	4	
#3	4	
#4	4	
#5	5	
Total	19	

created with
eduqas Part of WJEC Question Bank

#1

(a) The density of glass in a bottle is 2·4 g/cm^3.
The volume of glass used to make the bottle is 13·4 cm^3.

Calculate the mass of the glass bottle.
Give your answer in grams. [2]

Mass ..... g

Question taken from Eduqas examination paper 530004, June 2019

#2

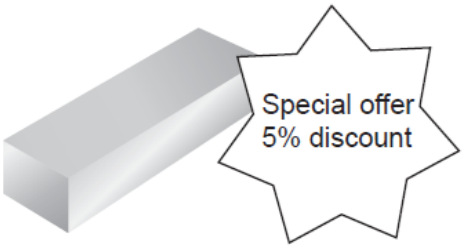
The density of copper is 8·96 g / cm^3.
A solid copper statue has a volume of 1540 cm^3.
Calculate its mass in kilograms.
Give your answer correct to two significant figures. [4]

Mass = ... kg

Question taken from Eduqas examination paper 530004, November 2024

#3

Bjorn is a jewellery maker.



(b) The silver bar is in the shape of a cuboid and has the following dimensions: length 8·1 cm, width 7·3 cm and depth 4 cm.

Bjorn melts down the silver bar and uses the silver to make 200 identical pieces of jewellery.

The density of silver is 10·49 g/cm^3.

Calculate the mass of each piece of jewellery.
Give your answer in grams. [4]

Each piece of jewellery has a mass of ..... g

Question taken from Eduqas examination paper 530004, November 2023

#4

Adanna wants to buy a ring.



The ring she wants has a mass of 12 g when made from gold.
The density of the gold in the ring is 19·32 g/cm^3.

The same ring could also be made from silver.
The density of the silver in the ring would be 10·48 g/cm^3.

Calculate the difference in the masses of the two rings. [4]

Difference in mass is ..... g

Question taken from Eduqas examination paper 530004, June 2018

#5

Candice has been given a bracelet.

The dimensions of the bracelet are given below.

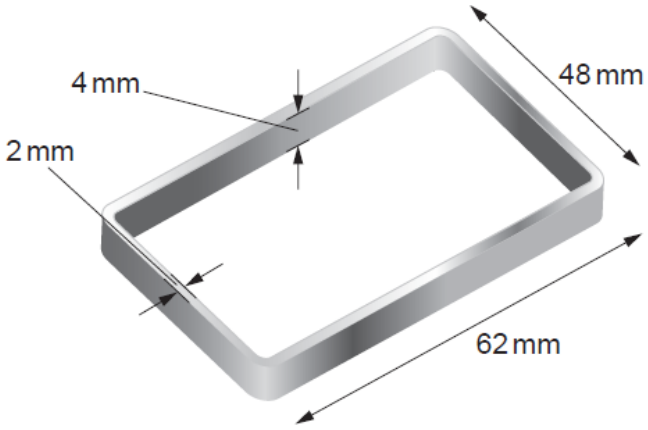


Diagram not drawn to scale

Candice knows it is made entirely from one metal. She is not sure if it is copper, silver or gold. Her bracelet has a mass of approximately 18 g.

Metal	Density (g/cm^3)
Copper	8·96
Silver	10·49
Gold	19·32

Convince Candice that her bracelet is made from silver.
You must show all your working. [5]

Question taken from Eduqas examination paper 530004, November 2019

Proportional Rates: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	3	
#4	5	
#5	6	
Total	20	

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#1

In a factory, 6 identical machines can make 3000 erasers in 2 hours.

How long would it take 8 of these machines to make 1000 erasers? [3]

Question taken from Eduqas examination paper 530003, May 2022

#2

6 printers take 36 minutes to print a number of identical booklets.
How long will it take 9 printers to print **half** as many of these booklets?
You may assume that all printers print at the same rate. [3]

Question taken from Eduqas examination paper 530003, May 2024

#3 It takes 2 hours to empty 8 identical tanks of water using 9 identical pumps.

How long would it take to empty 2 of these tanks using 3 of these pumps? [3]

.....

.....

.....

.....

.....

.....

.....

Question taken from Eduqas examination paper 530003, November 2023

#4

It takes

- 2 park keepers 1 hour to weed 2 flowerbeds
- 3 park keepers 2 hours to prune 6 trees.

At 9 a.m. one morning, 5 park keepers start work as follows.

Number of park keepers	Activity
2	Weed: **2** flowerbeds
3	Prune: **13** trees

When one activity has been completed all the park keepers work on the other activity.
You may assume that all the park keepers work at the same rate and are equally skilled.

How long does it take for the park keepers to complete the pruning and weeding?
You must show all your working. [5]

Total time = ... hours

Question taken from Eduqas examination paper 530003, November 2018

#5

(a) 5 waiters earn a total of £2500 for 2 weeks' work.

How much would 6 waiters earn for 3 weeks' work at the same pay rate?
You may assume that all the waiters earn the same amount each week. [3]

(b) x chefs earn a total of £m for 5 hours' work.
You may assume that all the chefs earn the same amount each hour.

(i) Find an algebraic expression for a chef's hourly rate of pay. [1]

(ii) The chefs get a pay increase of £y per hour.

Find an expression for the amount earned by a chef who works for 7 hours at this new pay rate. [2]

Question taken from Eduqas examination paper 530003, June 2018

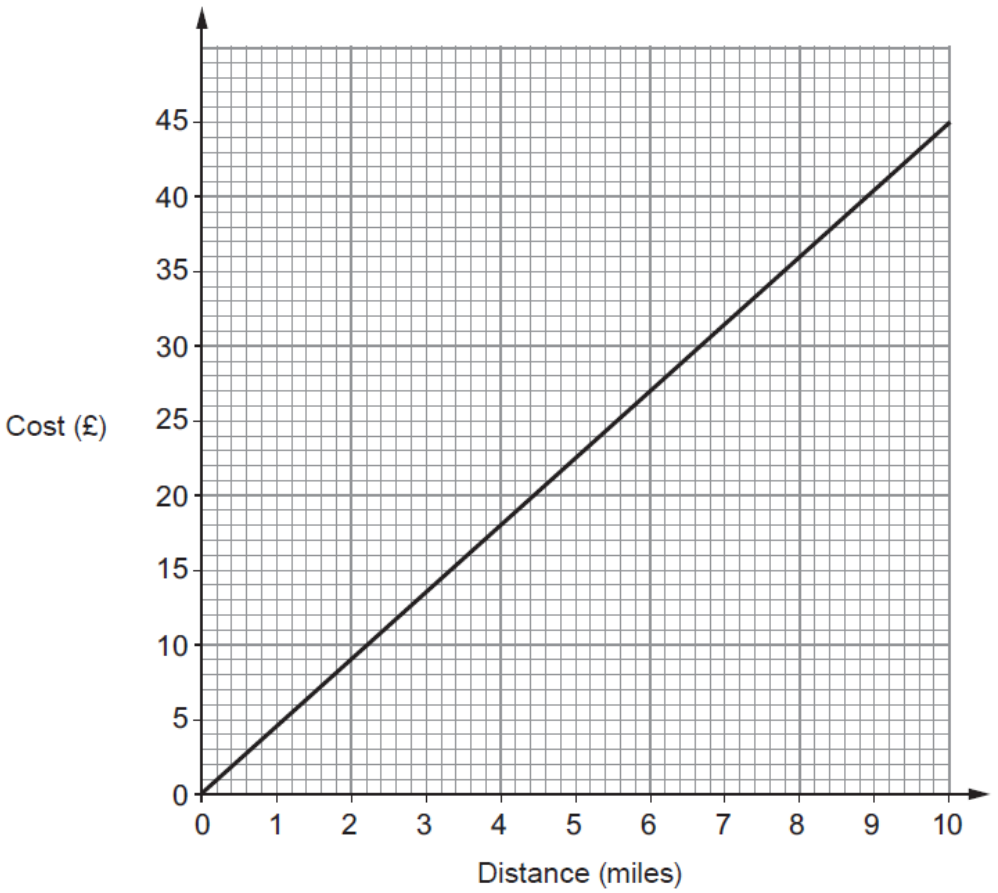
Conversion Graphs: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

created with
eduqas Part of WJEC Question Bank

#1

The graph shows the cost of delivery for goods bought at a furniture shop.



(a) Ceri buys a sofa from this shop and has it delivered.
Ceri lives 4 miles from the shop.

How much does Ceri pay for the delivery? [1]

.....

.....

(b) (i) Tick the correct statement about the distance and cost. [1]

They are not in proportion. ☐

They are in inverse proportion. ☐

They are in direct proportion. ☐

They are in indirect proportion. ☐

(ii) Find the gradient of the line and state what it represents in this context. [3]

.....

.....

.....

.....

Question taken from Eduqas examination paper 530003, November 2018

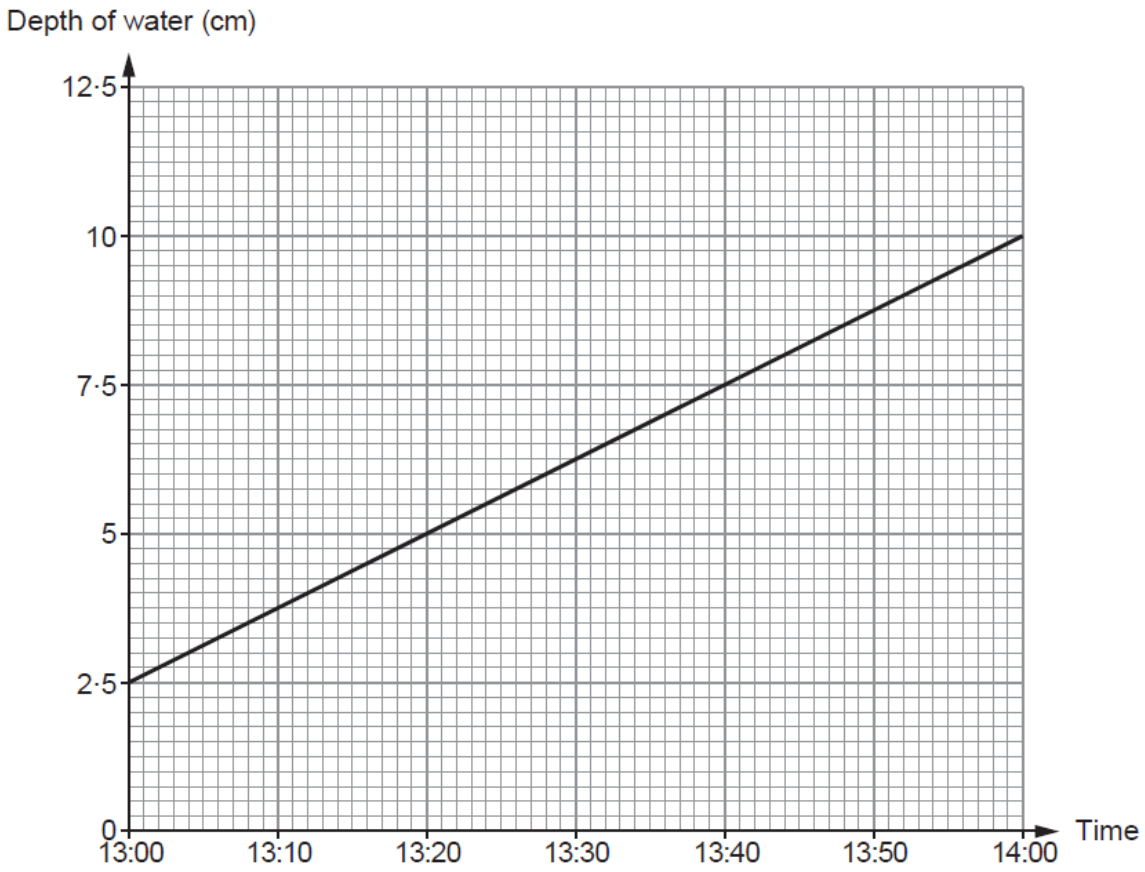
Conversion Graphs: Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	7	
Total	11	

created with
eduqas Part of WJEC Question Bank

#1

The graph below shows the water level in a container from 13:00 to 14:00.



(a) Calculate the rate of the increase in the depth of water in the container.
Give your answer in cm/min. [2]

.....

.....

Rate of increase ..... cm/min

(b) (i) If the depth of water in the container continues to rise at the same rate, what would be the height of the water in the container at 15:20? [1]

.....

.....

(ii) Why may it not be sensible to state the height of the water in the container at 17:00? [1]

.....

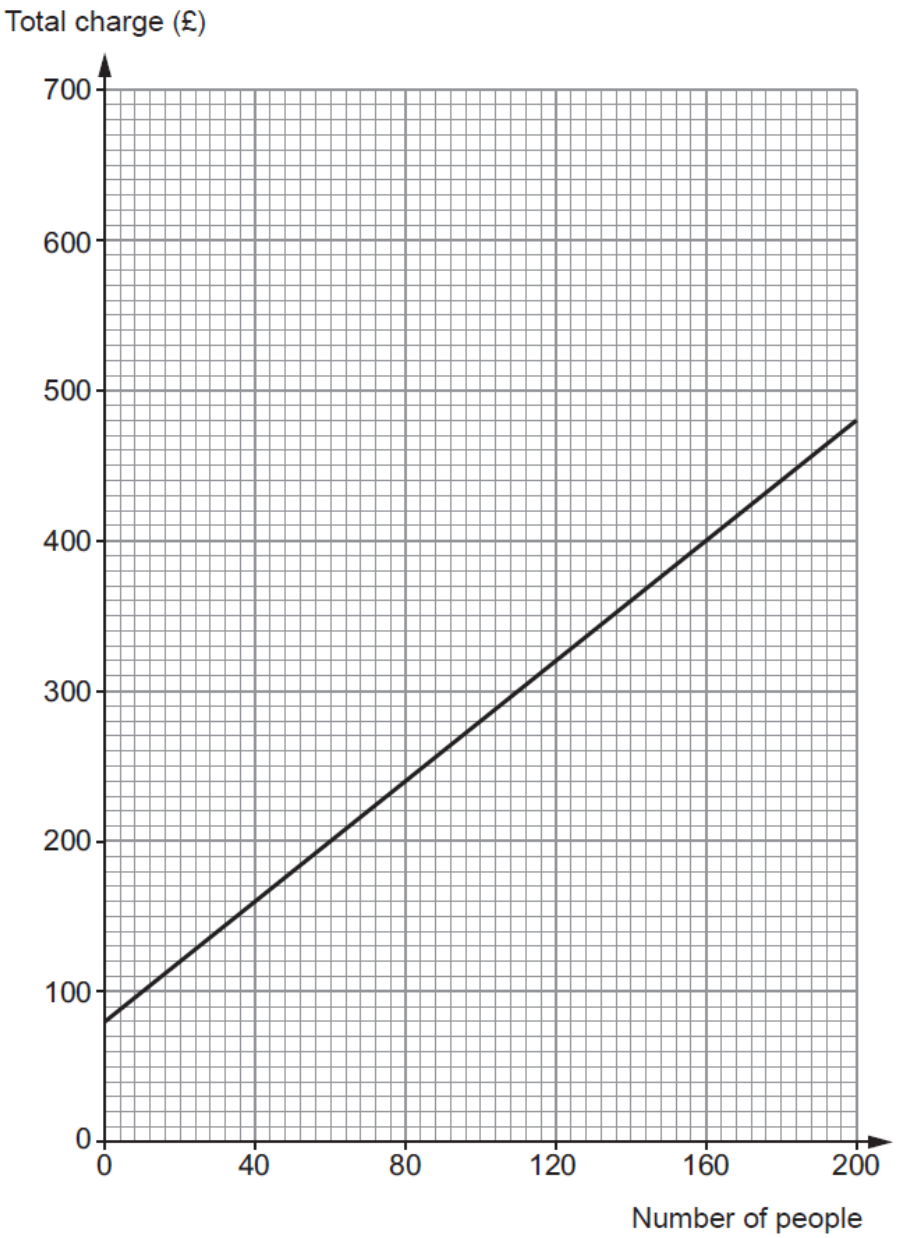
.....

Question taken from Eduqas examination paper 530004, June 2019

#2

Lewis is organising a music festival for up to 200 people.

He has investigated the charges for booking bands.
The band *Rightjet* gives its charges using a graph, as shown below.



(a) Find the gradient of the graph and state the units of your answer. [2]

.....

.....

.....

.....

(b) (i) The band *Draigetal* charges a fee of £60 and an additional £3 per person. On the same axes as *Rightjet*, draw a graph to show *Draigetal's* total charges for up to 200 people. [2]

.....

.....

.....

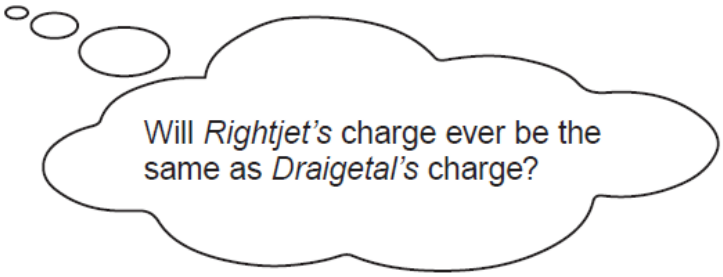
.....

(ii) Let t represent the total charge, in pounds, and p represent the number of people. Hence, write down the equation of the line you have drawn in part *(b)*(i). [1]

.....

.....

(c) Lewis wonders,



Complete the following statement.

'If ..... people attend, the charge would be the same for having the band *Rightjet* or the band *Draigetal*. This charge would be £ .....' [2]

Question taken from Eduqas examination paper 530004, June 2018

Scale Factor / Diagram: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
Total	2	

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eduqas Part of WJEC Question Bank

#1

A road track measures 2·2 cm on a map with a scale of 1 : 25 000.

What is the actual length of the road track?
Give your answer in km. [2]

.....

.....

Actual length ..... km

Question taken from Eduqas examination paper 530004, November 2018

Ratio: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	3	
#3	3	
#4	3	
#5	3	
#6	4	
#7	4	
#8	4	
#9	4	
#10	4	
#11	5	
#12	8	
Total	47	

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#1

Ivy mixes lemon juice, pineapple juice and orange juice in the ratio 1 : 2 : 7 to make a fruit drink.
Ivy has 330 ml of her fruit drink in a glass.

How much pineapple juice is in Ivy's glass? [2]

.....

.....

.....

..... ml

Question taken from Eduqas examination paper 530003, November 2023

#2

Lena makes a fruit drink by mixing orange juice, pineapple juice and sparkling water in the ratio

orange : pineapple : water = 3 : 2 : 7.

(a) What fraction of the mix is water? [1]

.....

.....

.....

(b) Lena pours 300 ml of her fruit drink into a glass.

How much pineapple juice is in Lena's glass? [2]

.....

.....

.....

..... ml

Question taken from Eduqas examination paper 530003, November 2020

#3

The lengths of the three sides of a triangle are in the ratio 3 : 5 : 7.

(a) What fraction of the perimeter is the longest side of this triangle? [1]

(b) The perimeter of this triangle is 60 cm.

Find the length of each of the three sides of this triangle. [2]

..... cm, ... cm, ... cm

Question taken from Eduqas examination paper 530003, May 2023

#4

Jen is mixing some paints to make brown paint.

She made orange paint by mixing red paint and yellow paint.
40% of the orange paint was red paint.

She then mixes the orange paint with some blue paint in the ratio 20 : 21 to make brown paint.

What fraction of the brown paint is red paint? [3]

Question taken from Eduqas examination paper 530003, November 2023

#5

A glass of water is placed on a small table. The table stands on horizontal ground.

(a) The total mass of the table and the glass of water is 9·6 kg.



Diagram not drawn to scale

You are given the ratios,

mass of table : mass of glass of water = 11 : 1,
mass of empty glass : mass of water = 3 : 5.

What is the mass of the empty glass? [3]

Question taken from Eduqas examination paper 530003, November 2022

#6

(a) Three quantities A, B and C are in the ratio

$$A : B : C \text{ is } 13 : 7 : 2.$$

Given that $A - B = 48$, find the value of $A + B + C$. [4]

Question taken from Eduqas examination paper 530003, May 2022

#7

Jamil is taking a group of students on a camping trip.

(b) Jamil buys packs of sausages and packs of burgers for the trip in the ratio 3 : 4.
The cost of a pack of sausages is 75% of the cost of a pack of burgers.
Jamil buys 16 packs of burgers.
Each pack of burgers costs £x.
He spends £125 in total.

How much does Jamil pay for each pack of sausages? [4]

Each pack of **sausages** costs £ .....

Question taken from Eduqas examination paper 530003, June 2018

#8

(b) Sura is making a cake. The main ingredients are flour, sugar and dried fruit.
She uses these ingredients with their masses in the ratio 5 : 3 : 7.

(i) What fraction of the main ingredients is the mass of the dried fruit? [1]

(ii) The combined mass of the flour and sugar is 560 g.
What is the mass of the dried fruit? [3]

Question taken from Eduqas examination paper 530003, November 2024

#9

Three friends, Louis, Krystal and Jamal win some money in a competition.
They share the money in the ratio 3 : 7 : 11.

(a) What fraction of the total money won is given to Jamal? [1]

(b) **Jamal** spends £45 of the money he won.
He now has exactly twice as much as **Louis** won.
How much money did **Krystal** win? [3]

Question taken from Eduqas examination paper 530003, May 2024

#10

A catering company made 40 trays of sandwiches for a party buffet.
Each tray contained the same number of sandwiches.

They made trays of egg, trays of cheese and trays of meat sandwiches in the ratio

egg : cheese : meat = 1 : 3 : 4.

At the end of the party, 20% of the egg sandwiches, 10% of the cheese sandwiches and 25% of the meat sandwiches were uneaten.

How many trays of sandwiches were uneaten? [4]

..... trays of sandwiches

Question taken from Eduqas examination paper 530003, November 2021

#11

(a) Eric currently spends £36 each week playing ten pin bowling.

He wants to decrease this amount by $\frac{3}{8}$.

He writes:

New amount	:	Current amount
3	:	8
13.50	:	36

I will now spend £13.50 each week playing ten pin bowling

(i) Explain why Eric's **method** is not correct. [1]

.....

.....

(ii) Describe what Eric's **answer** of £13.50 actually represents. [1]

.....

.....

(b) Three integers a, b and c are in the ratios

$$a : b = 9 : 2 \quad \text{and} \quad b : c = 6 : 7.$$

It is known that $a + b + c = 200$.

Find the integers a, b and c. [3]

.....

.....

.....

.....

.....

.....

.....

a = ... b = ... c = ...

Question taken from Eduqas examination paper 530003, November 2020

#12

(a) The costs of building a single-storey house extension are in the ratio

labour : materials : professional fees = 7 : 5 : 1.

The cost of materials is £6400 **more than** the amount paid in professional fees.

Work out the total cost of building this house extension. [4]

(b) Ten years ago, the costs of converting a loft to a bedroom were £7200 for labour, £6000 for materials and £1200 for professional fees.

Today, the same loft conversion would cost a total of £30800.

- Labour costs are $1\frac{2}{3}$ times as much.
- Materials costs have **increased** by 150%.

Show that the amount paid in professional fees is just over 3 times as much. [4]

Question taken from Eduqas examination paper 530003, June 2018

Ratio: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	3	
#3	3	
#4	3	
#5	4	
#6	5	
#7	7	
#8	7	
Total	34	

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#1

A length of wire is cut into 3 pieces.
The 2 shortest pieces are the same length.
The longest piece is 3 times the length of each of the shortest pieces.

(a) Write down the ratio of the lengths of the 3 pieces of wire. [1]

.....

.....

(b) What fraction of the original length of wire is the longest piece? [1]

.....

.....

Question taken from Eduqas examination paper 530004, November 2018

#2

Jan, Freda and Pieter share some money.

Freda gets 3 times as much as Jan.
Pieter gets half as much as Freda.

(a) Write down the ratio of the amounts of money that they each get.
Give your answer in its simplest form. [2]

.....

.....

.....

Jan : Freda : Pieter = ... : ..... : .....

(b) What fraction of the money does Pieter get? [1]

.....

.....

.....

Question taken from Eduqas examination paper 530004, June 2022

#3

Nathan and Lucy make and sell wooden items for gardens.

(a) Nathan makes and sells benches, tables and tool sheds.
Last year, the profit he made from selling these items was in the following ratio.

benches	:	tables	:	tool sheds
2	:	3	:	7

(i) What fraction of his profit did Nathan make from selling benches and tables? [1]

.....

.....

.....

(ii) His total profit was £18 072.

How much profit did Nathan make from the sale of tool sheds? [2]

.....

.....

.....

.....

.....

Question taken from Eduqas examination paper 530004, November 2022

#4

Shortbread biscuits are made from flour, butter and sugar.
Their masses are in the ratio 4 : 3 : 2 respectively.

(a) What fraction of a shortbread biscuit is made up of sugar? [1]

.....

(b) 1400 g of flour is used to make a batch of shortbread biscuits.
How many grams of butter is used for this batch of shortbread biscuits? [2]

.....

.....

.....

.....

..... g of butter.

Question taken from Eduqas examination paper 530004, November 2023

#5

(a) 7476 football supporters watched the first match of the season.

The ratio of men : women : children was 10 : 8 : 3.

Show that 712 more men than women watched the match. [2]

(b) At the second match of the season, the ratio of adults : children was 5 : 3.

At the third match, $\frac{2}{3}$ of the supporters were adults.

At which of these two matches was the proportion of adults higher?

You must show your working. [2]

Second match ☐ Third match ☐

Question taken from Eduqas examination paper 530004, November 2020

#6

(a) Albert sells bird food in 28·8 kg sacks.
The bird food is a mix of millet, peanuts and sunflower seeds.
It contains, by mass, the millet, peanuts and sunflower seeds in the ratio 4 : 5 : 7.

To make the bird food mix, Albert pays
- 95p per kg for millet,
- £1.04 per kg for peanuts, and
- 75p per kg for sunflower seeds.

On Friday, Albert sold twelve 28·8 kg sacks of bird food for £29.99 each.

How much profit did Albert make from selling the bird food on Friday? [5]

Question taken from Eduqas examination paper 530004, November 2018

#7

(a) A bronze statue is made mainly from copper, with 12% tin and some nickel.

The quantity of nickel is $\frac{1}{6}$ of the quantity of tin.

What is the ratio copper : tin : nickel in this statue?
Give your answer in its simplest form. [4]



Copper	:	Tin	:	Nickel
.....	:	.....	:	.....

(b) A different statue in a museum is made from copper, tin and zinc in the ratio 65 : 14 : 9.



There are 27 kg of zinc in the statue.

The museum crane cannot lift more than $\frac{1}{4}$ tonne.

Is it possible for this crane to lift this statue?

You must show all your working and give a reason for your answer. [3]

Reason:

Question taken from Eduqas examination paper 530004, June 2018

#8

(a)

Recipe for scones	
Ratio of ingredients flour : butter : sugar 70 : 17 : 10	

Nadeen has 102 g of butter and plenty of flour and sugar.
Nadeen uses all this butter to make scones.

Calculate the quantity of flour and sugar Nadeen needs. [3]

Flour ..... g

Sugar ..... g

(b)

Nutrition per scone				
kcal	fat	carbohydrates	fibre	protein
268	10 g	41 g	1 g	6 g

Nadeen has been recommended to eat 2200 kcal per day.
She eats two scones for lunch.
Her breakfast was 390 kcals.

What percentage of the recommended daily kcals does Nadeen have **left** for meals later in the day?
Give your answer correct to the nearest 0.01%. [4]

Question taken from Eduqas examination paper 530004, November 2019

Growth / Decay: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	4	
#4	6	
Total	16	

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#1

Jon bought a car.
The price of Jon's car had been reduced by 20%.
Jon paid £7680 for his car.

What was the price of the car before the reduction? [3]

Question taken from Eduqas examination paper 530003, June 2019

#2

Alison lives in a town with a population of 45 000.

It is predicted that the population of the town will:
- increase by 2% **every six months** for the next 4 years
- decrease by 5% **per year** for the following 3 years.

(a) Alison wants to calculate what the population of the town will be after 7 years.
She completes the boxes in the calculation below:

Population = **45 000** **$\times 1.02^4$** **$\div 1.05^3$**

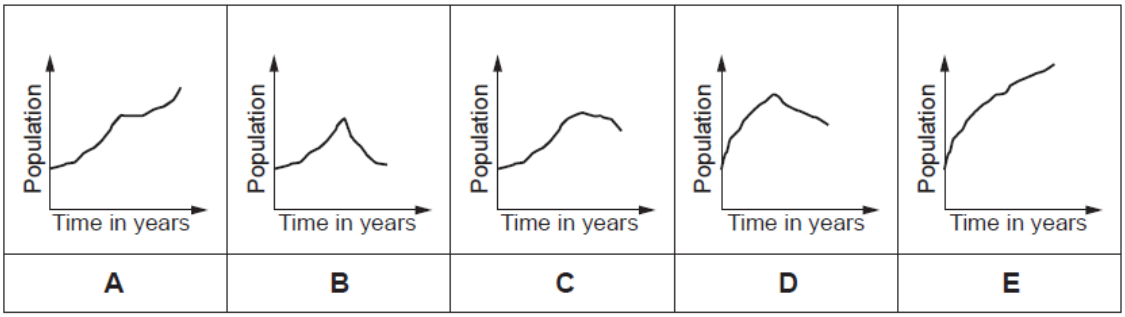
Both boxes have been completed incorrectly.
Complete each box below with the correct calculation. [2]

.....

.....

Population = **45 000** ☐ ☐

(b) Circle the sketch that best shows the town's changing population over the 7-year period. [1]



Question taken from Eduqas examination paper 530003, November 2024

#3

Alec bought a house.
By the end of the first year, the value of Alec's house had increased by 1%.
By the end of the second year, its value had decreased by 10% of its value at the end of the first year.

Use multipliers to work out the overall percentage decrease in the value of Alec's house for this two-year period. [4]

.....

.....

.....

.....

.....

.....

.....

Percentage reduction = ... %

Question taken from Eduqas examination paper 530003, November 2018

#4

(a) Delyth borrows £3450 from a family member who charges her 2% per year simple interest.
She pays all the money back in one payment after 1 year 3 months.

How much interest does Delyth pay? [3]

Interest £ .....

(b) Aiden invested £65 for 5 years at a rate of r % simple interest per year.
No extra money was paid in and no money was withdrawn during these 5 years.
At the end of the 5 years he received £9.75 interest in total.

Find the value of r. [3]

r = ...

Question taken from Eduqas examination paper 530003, November 2019

Growth / Decay: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	3	
#4	4	
#5	4	
#6	4	
#7	4	
#8	5	
#9	5	
#10	5	
#11	6	
#12	7	
#13	7	
Total	60	

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#1

25 years ago, Raveena's grandparents invested £500 for her in an account paying 3·4% compound interest per annum.
No extra money was paid in and no money was withdrawn during these 25 years.

Raveena has decided to withdraw all the money in the account after 25 years.

How much should Raveena receive?
Give your answer correct to the nearest penny.
You must show all your working. [3]

Question taken from Eduqas examination paper 530004, November 2019

#2

(b) Emma buys a car for £8495.
Its value decreases by 16% each year.

What is the car's value after 11 years? [3]

Question taken from Eduqas examination paper 530004, November 2020

#3

Tori's grandfather buys a gold coin for her on the day she is born.
The coin costs £130.
The value of the coin is expected to increase by 6% each year.

What value is the coin expected to have on Tori's 10th birthday?
Give your answer correct to the nearest penny. [3]

Expected value of the coin £ .....

Question taken from Eduqas examination paper 530004, November 2021

#4

Lucy bought a car 9 years ago for £12 250.



The car depreciated in value by 18% in the **first** year.
In each of the following years, her car depreciated by 15% of its previous year's value.

By how much has the car decreased in value in the last 9 years? [4]

Lucy's car has decreased in value by .....

Question taken from Eduqas examination paper 530004, November 2023

#5

At the start of 2018, Pavel bought a used car.

At the start of 2019, its value had reduced by 38% of the purchase price.

At the start of 2020, its value had reduced by 16% of its value at the start of 2019.

At the start of 2020, the value of Pavel's car was £6510.



What was the purchase price of the car? [4]

Question taken from Eduqas examination paper 530004, November 2021

#6

Max bought a new computer.
In the first year, the value of Max's computer decreased by 19·8%.
In the second year, the value of Max's computer decreased by 6·5% of its value at the end of the first year.

Find the overall percentage decrease in the value of Max's computer at the end of the second year.
You must show all your working. [4]

Question taken from Eduqas examination paper 530004, November 2022

#7

Janet invests £5000 in a savings account for 9 years.
She makes no further payments into or out of her account in this time.

For the first 5 years, her investment earns 2% compound interest per year.
After this, the interest rate decreases to 1·3% compound interest per year.

How much is Janet's investment worth at the end of the 9 years? [4]

Question taken from Eduqas examination paper 530004, November 2022

#8

(a) £500 was invested in a savings account for Harry when he was born.
The compound interest paid on this account was 2·1% per annum.
On his 18th birthday he was given the full amount from the savings account.

How much money did Harry receive?
Give your answer correct to the nearest penny. [3]

(b) Mina was given £x, which she invested in an account paying y% compound interest per annum.
How much will Mina's investment be worth after 6 years?
Give your answer as an expression in terms of x and y. [2]

Question taken from Eduqas examination paper 530004, June 2018

#9



Enya's house is put up for sale at the start of April.
It does not sell, so at the start of May, the sale price of the house is reduced by 20%.
At the start of June, the sale price is reduced by 15% of the price at the start of May.

(a) Enya says,

"My house has been reduced in price by a total of 35%."

Explain why Enya is incorrect. [1]

(b) The house is then sold for £306 000.

What was the original sale price of the house at the beginning of April? [4]

Question taken from Eduqas examination paper 530004, June 2023

#10



Edudig Digger
£35 950

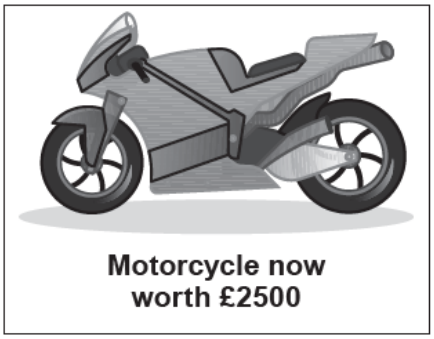
Samir buys this digger and expects to use it for 1250 hours each year.
The digger will decrease in value at a yearly rate of 18% of its value at the end of the previous year.

Use this information to calculate the decrease in value of Samir's digger when it has been used for 10 000 hours. [5]

Question taken from Eduqas examination paper 530004, June 2022

#11

(a) This motorcycle depreciates by 16% per annum.



Motorcycle now worth £2500

After how many whole years will this motorcycle be worth less than £1000?
You must show all your working. [3]

Motorcycle will be worth less than £1000 after ..... whole years.

(b) Rachela takes out a loan for £500 from an online loan company.
The interest rate is 325% per annum.

Rachela is thinking she would pay off the loan and interest in full after 3 years.
A friend correctly says,

"That is a very high rate of interest. You will owe over £30000."

Calculate the total amount Rachela would have to pay back after 3 years. [3]

Question taken from Eduqas examination paper 530004, June 2019

#12

Heath has £3000 to invest for five years.
No extra money will be paid in or withdrawn during these five years.
He is going to choose one of these accounts.

Account A	**Account B**
4% compound interest per year Interest rates can vary	Guaranteed interest at the end of 5 years of £190 for each £1000 invested

(a) Which account gives Heath the greater **percentage increase** in his money at the end of 5 years and by how much is it greater?

Show how you decide. State any assumption that you make. [6]

Account ..... gives the greater percentage increase by ..... %

Assumption .....

(b) Comment on the effect that your assumption in part (a) has had on your decision. [1]

Question taken from Eduqas examination paper 530004, June 2023

#13

Ms Leighton arranged a £15 000 loan for 22 years to buy a canal boat.
After 22 years the loan is to be paid back in full together with compound interest at 3·4% per annum.

(a) Ms Leighton did not plan to make any payments during the 22 years.

How much would Ms Leighton need to pay back after 22 years? [3]

(b) In fact, Ms Leighton paid off £10 000 of the loan in a single payment at the end of 10 years. For each of the next 12 years compound interest continues to be charged at rate of 3·4% per annum on the amount owed.

How much would Ms Leighton pay back **in total** during the full period of the loan? Give your answer to the nearest £. [4]

Question taken from Eduqas examination paper 530004, November 2018

Standard Form: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	2	
#3	3	
#4	3	
#5	3	
#6	3	
#7	3	
#8	4	
#9	4	
#10	5	
#11	5	
Total	37	

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#1

Hans thinks of a number.
When his number is multiplied by $2{\cdot}4 \times 10^5$, the answer is $9{\cdot}6 \times 10^8$.

What number did Hans think of?
Write your answer in standard form. [2]

Question taken from Eduqas examination paper 530003, November 2023

#2

Light travels at 3×10^5 kilometres per second.
The circumference of the Earth at the equator is 40 000 km.

Show that, in theory, a beam of light could circle the Earth at the equator more than 7 times in 1 second. [2]

Question taken from Eduqas examination paper 530003, November 2018

#3

In 2018, the total volume of ice in the Greenland ice sheet was $2{\cdot}99 \times 10^6$ km^3.
The total surface area of the ice sheet was $1{\cdot}799 \times 10^6$ km^2.

Assuming that the depth of the ice was constant for the whole ice sheet, **estimate** the depth of the ice in 2018.
You must state the units of your answer. [3]

Depth of ice = ... Units .....

Question taken from Eduqas examination paper 530003, November 2019

#4

(c) **Estimate** the value of $\left(1{\cdot}9 \times 10^3\right)^5$.

Give your answer in standard form. [3]

Question taken from Eduqas examination paper 530003, November 2024

#5

(c) **Estimate** the value of $\left(3{\cdot}9 \times 10^6\right)^3$.
Give your answer in standard form. [3]

Estimate .....

Question taken from Eduqas examination paper 530003, November 2020

#6

(c) **Estimate** the value of $\frac{(1{\cdot}96 \times 10^8) + (6{\cdot}89 \times 10^8)}{298}$.

Write your answer in standard form. [3]

Question taken from Eduqas examination paper 530003, November 2023

#7

The surface area of the Earth is $5{\cdot}101 \times 10^8$ km^2.
The Earth's oceans are 70·9% of this surface area.

Estimate the surface area of the Earth's oceans.
Give your answer in standard form. [3]



Question taken from Eduqas examination paper 530003, May 2023

#8

(a) Calculate the value of $\frac{1{\cdot}29\times10^{5}}{3\times10^{-7}}$.

Give your answer in standard form. [2]

(b) Calculate the value of $\left(7{\cdot}6\times10^{5}\right)+\left(3\times10^{4}\right)$.

Give your answer in standard form. [2]

Question taken from Eduqas examination paper 530003, May 2024

#9 The table shows the population and area of land for country X.

	Population	Area (km^2)
Country X	$2{\cdot}16 \times 10^7$	3000

Population density can be measured in number of people per square kilometre.
The population density of country Y is 8000 people per km^2.

Which country has the greater population density and by how much is it greater? [4]

The population density of country .....

is greater by ..... people per km^2.

Question taken from Eduqas examination paper 530003, May 2022

#10

(a) Find the value of $(3 \times 10^{17}) \times (8 \times 10^{9})$.
Give your answer in standard form. [2]

(b) In a particular country for one year:
- the total energy consumption was $5{\cdot}4 \times 10^{11}$ kilowatt hours,
- the average energy consumption per person was 6000 kilowatt hours.

Work out the population of the country.
Give your answer in standard form. [3]

Question taken from Eduqas examination paper 530003, June 2019

#11

(a) Work out $(6 \times 10^5) \div 20$.
Give your answer in standard form. [2]

(b) At midday, the volume of water flowing over a waterfall is 3×10^8 litres per minute.

At midday, what is the volume of water flowing over the waterfall in litres per hour?
Give your answer in standard form. [3]

Question taken from Eduqas examination paper 530003, November 2022

Standard Form: Calculator

Question	Maximum Mark	Mark Awarded
#1	1	
#2	3	
#3	3	
Total	7	

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#1

1 micrometre = 1×10^{-4} centimetres.
Which of the answers below represents 2·4 micrometres in **metres**?
Circle your answer. [1]

$2{\cdot}4 \times 10^{-4}$ $2{\cdot}4 \times 10^{-6}$ $2{\cdot}4 \times 10^{2}$ $2{\cdot}4 \times 10^{-2}$ $2{\cdot}4 \times 10^{-5}$

Question taken from Eduqas examination paper 530004, November 2024

#2

The mass of the planet Mercury is $3{\cdot}30 \times 10^{23}$ kg.
The volume of the planet Mercury is $6{\cdot}08 \times 10^{19}$ m^3.



Calculate the density of the planet Mercury in kg/m^3.
Give your answer to 3 significant figures. [3]

Density = ... kg/m^3

Question taken from Eduqas examination paper 530004, November 2020

#3

1 AU is 1 astronomical unit.
1 AU = $1{\cdot}496 \times 10^8$ km, which is the distance from the Sun to Earth.

The distance between the planet Mercury and Earth can vary from 0·515 AU to 1·48 AU.

Complete the statement below.
Use kilometres written in standard form correct to **2 significant figures**.

'The distance between the planet Mercury and Earth can vary from ..... km to ..... km.' [3]

Question taken from Eduqas examination paper 530004, June 2018

Upper and Lower Bounds: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	4	
#3	5	
#4	6	
Total	17	

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#1

Oliver and Kian bake cakes.

The mass of Oliver's cake is between 400 g and 500 g inclusive.
The mass of Kian's cake is between 200 g and 300 g inclusive.

Complete the inequality to show the least and greatest possible differences between the mass of their cakes. [2]

..... ⩽ mass difference ⩽ .....

.....

.....

Question taken from Eduqas examination paper 530003, November 2023

#2

(a) Mary and Paul run 100 metres.

Mary's time is between 14 and 15 seconds inclusive.
Paul's time is between 12 and 13 seconds inclusive.

Complete the inequality to show the least and greatest possible difference between the times of these two runners. [2]

..... ⩽ time difference ⩽ .....

(b) Peter wants to go by ferry to France.
He is taking a van and a small trailer.
He knows:

- the van is 590 centimetres long, correct to the nearest 10 cm
- the trailer is 200 centimetres long, correct to the nearest 10 cm.

The ferry company uses the following rules for the length of vehicles.

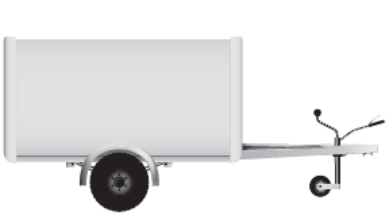




Diagram not drawn to scale

Small trailer: maximum length 2 m	Van: maximum length 6 m

Peter thinks that the length of his van and the length of his trailer will **both** fit the rules.

Use lengths to give one example to show how Peter **may** be correct, and one example to show how Peter **may not** be correct. [2]

May be correct .....

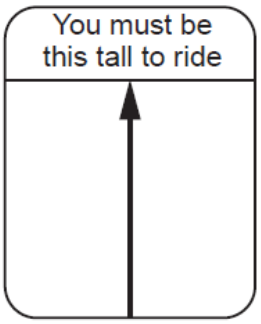
May not be correct .....

Question taken from Eduqas examination paper 530003, November 2022

#3

When Jenna was measured recently she was 127 cm tall, **correct to the nearest centimetre**.

For safety reasons, the minimum height for a person to ride the Big Coaster at a funfair in the USA is 50 inches.



You are given:
20 inches = 50·8 cm.

(a) Using the information given, decide whether it might possibly be safe, it is definitely safe, or it is definitely not safe for Jenna to ride the Big Coaster.

Might possibly be safe ☐ Definitely safe ☐ Definitely not safe ☐

Show how you decide. [3]

(b) (i) State an assumption that you have made in your answer to part *(a)*. [1]

(ii) Comment on the effect that your assumption has had on your decision. [1]

Question taken from Eduqas examination paper 530003, June 2019

#4

Paula is baking biscuits for a charity fundraiser.
She makes biscuits in batches of 12.

Paula's weighing scales are accurate **to the nearest gram**.
She needs to weigh 8 grams of baking powder to make 12 biscuits.

She has 220 grams of baking powder, **correct to the nearest 10 grams**.
She has plenty of all the other ingredients she needs.

She plans to sell her biscuits at £2 for a pack of 3.

What is the greatest amount of money that Paula could raise for her charity?
You must show all your working. [6]

Question taken from Eduqas examination paper 530003, June 2019

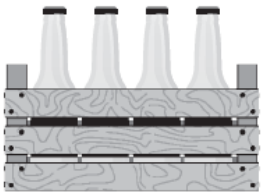
Upper and Lower Bounds: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	4	
#4	4	
#5	4	
#6	4	
#7	5	
Total	27	

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#1

The mass of an empty crate is 720 g, **correct to the nearest 10 g**.
The crate holds 4 bottles.
Each full bottle weighs 310 g, **correct to the nearest 10 g**.



Calculate the minimum mass of the crate containing 4 full bottles.
You must show all your working. [3]

Minimum mass is ..... g

Question taken from Eduqas examination paper 530004, June 2018

#2

Kian went for a run.
The route he runs is 3000 metres, **correct to the nearest 100 metres**.
He ran the route in a time of 720 seconds, **correct to the nearest 10 seconds**.

Calculate Kian's **greatest** possible average speed for this run.
Give your answer in metres per second.
You must show all your working. [3]

Kian's greatest possible average speed is ..... metres per second.

Question taken from Eduqas examination paper 530004, June 2024

#3

(c) A preformed piece of coal weighs 100 g **correct to the nearest 5 g**.
A bag contains 30 pieces of preformed coal.

Complete the sticker to attach to this bag of coal. [4]



This bag of coal weighs **at least**

..... **kg**

.....

.....

.....

.....

Question taken from Eduqas examination paper 530004, November 2019

#4

The density of a piece of stainless steel is 7750 kg/m^3, correct to the nearest 5 kg/m^3.
A block of this stainless steel is in the shape of a cuboid.
The dimensions of the cuboid are 0·33 m, 0·22 m and 0·11 m, all given correct to the nearest 1 cm.

Calculate the least possible mass of the block.
Give your answer in kg, correct to 1 decimal place.
You must show all your working. [4]

Least possible mass is ..... kg

Question taken from Eduqas examination paper 530004, November 2018

#5

Enrico and Hugo are both boxers.

At the start of a six-week training block:

- Enrico weighs **exactly** 170 pounds.
- Hugo weighs **exactly** 175 pounds.

After the six-week training block:

- Enrico has lost 9 pounds, **correct to the nearest pound**.
- Hugo has lost 12 pounds, **correct to the nearest two pounds**.

What is the greatest possible difference between Enrico's **percentage** weight loss and Hugo's **percentage** weight loss? [4]

The greatest possible difference between Enrico's percentage weight loss and Hugo's percentage weight loss is ..... %.

Question taken from Eduqas examination paper 530004, November 2024

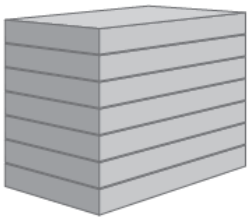
#6

Some boxes of medicine must be stored on shelves in a refrigerator.



The vertical height between the shelves is 38 cm, **correct to the nearest cm**.

7 identical boxes of medicine are stacked on top of each other on one shelf.



Each box of medicine has a height of 45 mm, **correct to the nearest mm**.

What is the largest possible gap between the top of this stack of boxes and the shelf above?

[4]

The largest possible gap is .....

Question taken from Eduqas examination paper 530004, November 2023

#7

The area of country *A* is 1 078 000 km^2, correct to 4 significant figures.
The area of country *B* is 249 300 km^2, correct to 4 significant figures.
The two countries merge to form country C.

(a) Calculate the upper bound of the area of country C. [2]

(b) The population density of a country is the number of people per km^2.
Country *C* has a population of 82 000 000, correct to the nearest million.

Calculate the least possible value of the population density for country *C*.
You must show all your working. [3]

Question taken from Eduqas examination paper 530004, June 2023

Surds: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	1	
#2	1	
#3	2	
#4	2	
#5	2	
#6	4	
#7	4	
#8	5	
#9	5	
#10	6	
#11	7	
#12	8	
#13	8	
#14	8	
#15	9	
Total	72	

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#1

(a) Simplify $5\sqrt{7}+3\sqrt{7}$. [1]

.....

.....

Question taken from Eduqas examination paper 530003, November 2021

#2

(b) Find the value of each of the following.

(i) $\sqrt{32}\times\sqrt{2}$ [1]

.....

.....

.....

Question taken from Eduqas examination paper 530003, November 2018

#3

(a) Simplify $7\sqrt{2}\times 3$ [1]

.....

.....

(b) Complete the calculation below.

$2\sqrt{11}\times$ ..... = 22 [1]

.....

Question taken from Eduqas examination paper 530003, November 2023

#4

(d) Write $\frac{42}{\sqrt{6}}$ in the form $a\sqrt{6}$ where a is an integer. [2]

Question taken from Eduqas examination paper 530003, November 2020

#5

(b) Write $\frac{6}{\sqrt{2}}$ in the form $a\sqrt{2}$ where a is an integer. [2]

Question taken from Eduqas examination paper 530003, November 2023

#6

The perpendicular height of a triangle is $\sqrt{5}$ cm.
The area of this triangle is $(10 - 3\sqrt{5})$ cm^2.

Find the length of the base of the triangle.
Give your answer in the form $p\sqrt{5} + q$ where p and q are integers. [4]

Question taken from Eduqas examination paper 530003, June 2018

#7

The mean of the three values x, $\frac{12}{\sqrt{3}}$ and $\left(\sqrt{3}\right)^5$ is $6\sqrt{3}$.

Calculate the value of x.
Give your answer in the form $a\sqrt{3}$ where a is an integer. [4]

Question taken from Eduqas examination paper 530003, May 2024

#8

Write $7-\sqrt{27}+\frac{44}{5+\sqrt{3}}$ in the form $p+q\sqrt{3}$. [5]

Question taken from Eduqas examination paper 530003, November 2022

#9 In this question all lengths are in centimetres.



Diagram not drawn to scale

The length of this rectangle is $\sqrt{5}+3$.

The perimeter of the rectangle is $8\sqrt{5}-2$.

Calculate the exact area of this rectangle. [5]

Question taken from Eduqas examination paper 530003, May 2023

#10

(a) Simplify $\frac{3}{\sqrt{3}}$. [1]

(b) Write $\sqrt{63}+\sqrt{175}$ in the form $k\sqrt{7}$, where k is an integer. [2]

(c) Expand and simplify $(4-2\sqrt{5})(2+\sqrt{5})$. [2]

(d) Complete the following identity. [1]

$$x^2-3\equiv(x-.....)(x+.....)$$

Question taken from Eduqas examination paper 530003, November 2018

#11

(a) Write $\sqrt{44}+\sqrt{275}$ in the form $k\sqrt{11}$, where k is an integer. [2]

(b) Show that $\frac{(\sqrt{3}-1)^2}{\sqrt{3}}$ can be written as $c\sqrt{3}+d$, where c and d are values to be found. [3]

(c) $2\sqrt{x}-\sqrt{y}=0$

Find a value for x and a value for y so that $\sqrt{x}$ and $\sqrt{y}$ are surds. [2]

x = ... y = ...

Question taken from Eduqas examination paper 530003, November 2019

#12

(a) Show that $\frac{\sqrt{63}}{\sqrt{7}}+\sqrt{147}+\sqrt{48}$ can be written in the form $a+b\sqrt{3}$, where a and b are integers. [3]

(b)

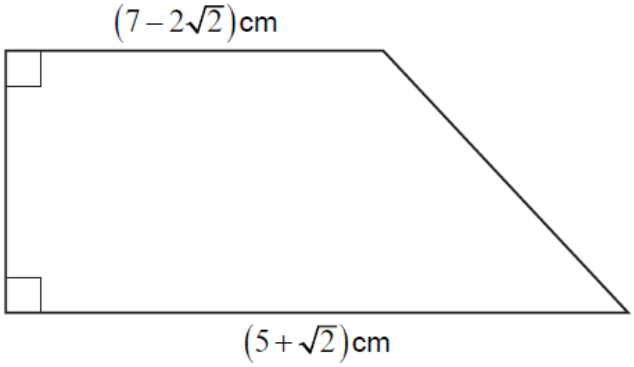


Diagram not drawn to scale

The area of this trapezium is $(6\sqrt{2}-1)\text{cm}^2$.

Find the height of the trapezium.
Give your answer in its simplest form. [5]

Question taken from Eduqas examination paper 530003, June 2019

#13

(a) Write $\sqrt{245}+\sqrt{80}$ in the form $a\sqrt{5}$, where a is an integer. [2]

(b) The length of a thin string is to be divided into two parts so that

$$\frac{\text{length of shorter part}}{\textbf{total} \text{ length of string}} = \frac{\sqrt{2}}{5+2\sqrt{2}} .$$

(i) Complete the following ratio. [1]

length of **shorter** part : length of **longer** part

..... : .....

(ii) The total length of the string is 17 cm.

Find the length of the shorter part of the string.
Give your answer in the form $b\sqrt{2}+c$, where b and c are integers. [5]

Question taken from Eduqas examination paper 530003, November 2021

#14

(a) Write $7\sqrt{3}\left(5\sqrt{3}-4\right)+\sqrt{27}$ in the form $a+b\sqrt{3}$, where a and b are integers. [3]

(b) In this question all lengths are in centimetres.

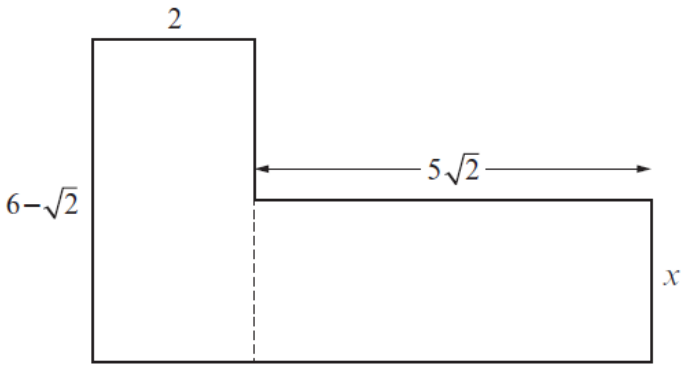


Diagram not drawn to scale

This shape is made from two rectangles.
The area of this shape is $33\sqrt{2}-18$.

Showing all your working, find the value of x.
Give your answer in the form $c+d\sqrt{2}$, where c and d are integers. [5]

Question taken from Eduqas examination paper 530003, May 2022

#15

(a) Simplify $\frac{35}{\sqrt{5}} - \sqrt{5}$. [3]

(b) Find the values of a and b to make the following equation correct.

$(5+2\sqrt{3})(4-a\sqrt{3})+40+b\sqrt{3}=18$ [6]

a = ... b = ...

Question taken from Eduqas examination paper 530003, November 2024

Product Rule for Counting: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	4	
#3	4	
#4	4	
#5	4	
#6	5	
#7	5	
Total	30	

created with
eduqas Part of WJEC Question Bank

#1

(a) How many different ways are there to arrange the letters A, B, C, D, E, F when each letter must be used exactly once? [2]

(b) Find the total number of these arrangements that start with either the letter A or the letter E. [2]

Question taken from Eduqas examination paper 530003, June 2018

#2

Anna has 7 photographs.

(a) Find the number of different ways that Anna can arrange her 7 photographs in a line on a table. [2]

(b) Find the number of different ways that Anna can randomly select 3 of her 7 photographs and arrange them in a line on a shelf. [2]

Question taken from Eduqas examination paper 530003, November 2018

#3

(a) A 5-course banquet has 3 options for each course.
The number of possible 5-course meals is m.

Find the value of m. [2]

.....

.....

.....

m = ...

(b) The caterer for the banquet decides to change the menu so that there are only 2 options for the first course. The options for the other courses remain the same.

The number of possible 5-course meals is now pm.

Find the value of p. [2]

.....

.....

.....

p = ...

Question taken from Eduqas examination paper 530003, November 2019

#4

Alys has 10 different-coloured tokens.
Each day, she chooses 3 of her tokens at random and places them in a row on her desk.

(a) Find the number of different ways in which this can be done. [2]

(b) One of her tokens is pink and another is green.

Find the number of arrangements where the middle token is pink or green. [2]

Question taken from Eduqas examination paper 530003, November 2020

#5 Adina has 5 wooden blocks. Each block is a different colour.

Blue	Red	Green	Yellow	Purple

Adina selects 3 of these wooden blocks at random.
Each time she does this, she places them on top of each other.
Two ways of arranging the blocks are shown below.

Blue
Yellow
Red

Green
Red
Purple

(a) Calculate the number of different ways of arranging the blocks. [2]

(b) How many arrangements are there where the middle block is **either** blue **or** red? [2]

Question taken from Eduqas examination paper 530003, November 2023

#6

Ravi needs to choose a 5-character passcode for a door lock.

He chooses to use 5 of these 7 characters:

1 9 6 7 R P #

Each chosen character is used only once.

(a) Find the number of different 5-character passcodes Ravi can make. [2]

(b) Find the probability that Ravi's 5-character passcode starts with R and ends with P. [3]

Question taken from Eduqas examination paper 530003, June 2019

#7

(a) Use the digits 1, 2, 3, 4 and 5.
How many different 3-digit whole numbers can be made, if each digit can be used more than once? [2]

(b) What is the probability that a 3-digit whole number made using the digits 1, 2, 3, 4 and 5 has no repeated digit? [3]

Question taken from Eduqas examination paper 530003, November 2022

Product Rule for Counting: Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	4	
#3	5	
#4	5	
Total	18	

created with
eduqas Part of WJEC Question Bank

#1

(a) How many 8-digit numbers can be made using the digits 2, 3, 4, 5, 6, 7, 8, 9 when each digit is used once? [2]

(b) How many **6-digit** numbers which start with a prime number can be made using the digits 2, 3, 4, 5, 6, 7, 8, 9 when each digit may be used at most once? [2]

Question taken from Eduqas examination paper 530004, November 2021

#2

Bert and Rehan use six-digit codes to lock their phones.
They must use these digits to create their code:

3	4	5	6	7	8

Each digit can only be used once in a code.

Bert's code must meet the following conditions:

- The first digit is a multiple of four.
- The second and third digits are both prime numbers.
- There are no conditions for the remaining digits.

Rehan does not have any conditions for his code.

How many more code combinations can Rehan choose from than Bert? [4]

Question taken from Eduqas examination paper 530004, November 2024

#3

Sian has seven numbered cards as shown below.



She shuffles them and turns them face down.
She then turns them over to make a 7-digit number.

(a) How many different 7-digit numbers can Sian make? [2]

(b) How many of these 7-digit numbers are multiples of 5? [2]

(c) What proportion of these 7-digit numbers are **not** multiples of 5? [1]

Question taken from Eduqas examination paper 530004, June 2023

#4

There are 8 seats in the front row of a theatre.
8 friends sit down in this row.



(a) When each friend can sit in any of the 8 seats, find the number of different seating arrangements possible. [2]

(b) Liesa and Todd are 2 of the 8 friends.

Find the probability that Liesa is sitting in the first seat on the left and Todd is sitting next to her. [3]

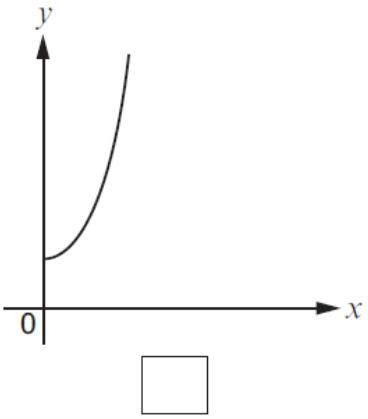
Question taken from Eduqas examination paper 530004, June 2022

Direct / Inverse Proportion: Non-Calculator

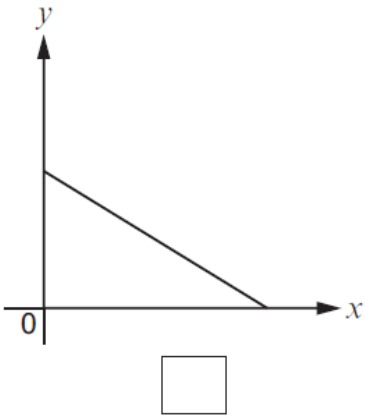
Question	Maximum Mark	Mark Awarded
#1	1	
#2	5	
#3	5	
#4	6	
#5	6	
#6	6	
Total	29	

created with
eduqas Part of WJEC Question Bank

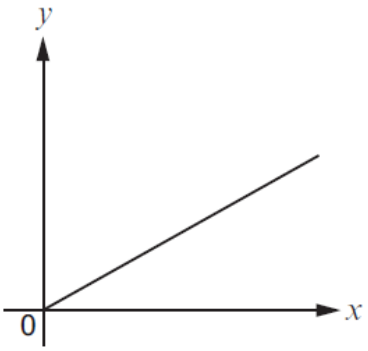
#1 Tick (✓) the box below the graph that shows y is inversely proportional to x. [1]



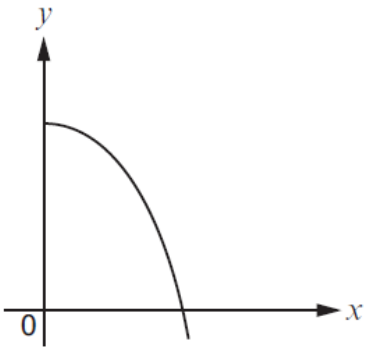
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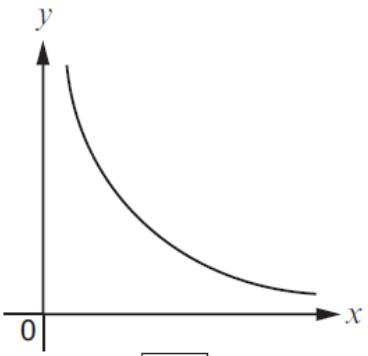
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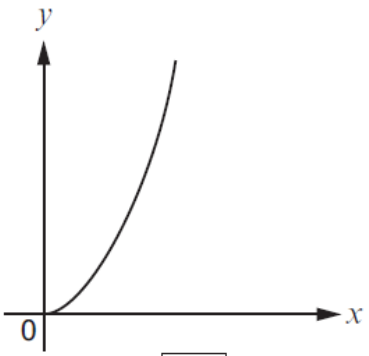
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Question taken from Eduqas examination paper 530003, June 2018

#2

(a) The pressure, P, in newtons per square metre, made by an object resting on a table-top is inversely proportional to the area, $A\,m^2$, of the object in contact with the table.

A book is placed on the table.
The area, A, of the book in contact with the table is $0{\cdot}08\,m^2$.
The pressure, P, made by the book on the table is $30\,N/m^2$.

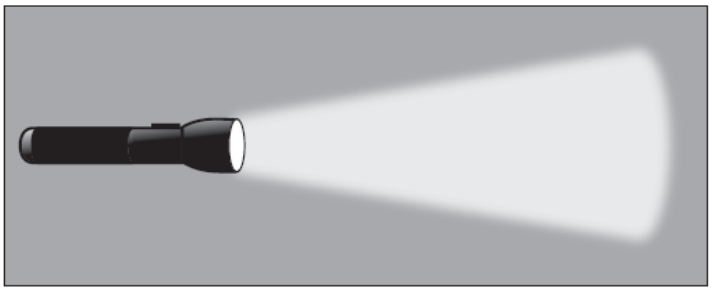
Find the relationship between pressure and area for any object of this weight. [3]

(b) A different book of the same weight is placed on the table.
The pressure exerted on the table by the book is $80\,N/m^2$.

Find the area of this book that is in contact with the table. [2]

Question taken from Eduqas examination paper 530003, June 2018

#3



The intensity of a light source, I candela, is inversely proportional to the square of the distance, d metres, from the light source.

From a distance of 2 metres, a torch has a light intensity of 7 candela.

Find the light intensity of the torch from a distance of 4 metres. [5]

Question taken from Eduqas examination paper 530003, November 2018

#4

It is known that y varies inversely as the cube root of x and that $y = 2$ when $x = 27$.

(a) Find a formula for y in terms of x. [3]

(b) Using your answer to part *(a)*, find

(i) y when $x = 1000$, [1]

(ii) x when $y = 3$. [2]

Question taken from Eduqas examination paper 530003, November 2019

#5

You are given that y is inversely proportional to x^2.
When $x = 4,\ y = 3$.

(a) Find a formula for y in terms of x. [3]

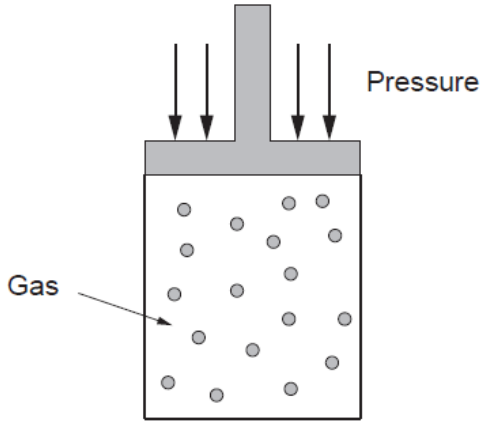
(b) (i) Use your formula to find the value of y when $x = 8$. [1]

(ii) Use your formula to find the positive value of x when $y = 1200$. [2]

Question taken from Eduqas examination paper 530003, May 2023

#6

In an experiment, the volume, V, of gas in a container is inversely proportional to the pressure, P, put upon it.



At the start of the experiment, a gas has a volume of $4\,m^3$ when the pressure put upon it is $1020\,N/m^2$.

(a) Find the volume of this gas when the pressure put upon it is $1360\,N/m^2$. [4]

(b) Find the pressure put upon the gas when its volume is $1{\cdot}2\,m^3$. [2]

Question taken from Eduqas examination paper 530003, November 2021

Direct / Inverse Proportion: Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	5	
#3	5	
#4	5	
#5	7	
Total	26	

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#1

A full bottle containing 1 litre of cooking oil has mass 1270 g.
400 ml of cooking oil is used.

The bottle with the remaining cooking oil has mass 900 g.



Calculate the mass of the empty bottle. [4]

Question taken from Eduqas examination paper 530004, November 2020

#2

You are given that y is inversely proportional to x, and that $y = 124{\cdot}5$ when $x = 18$.

(a) Find a formula for y in terms of x. [3]

(b) Use the formula you found in *(a)* to complete the following table. [2]

x	$\frac{1}{2}$	18	
y		124·5	90

Question taken from Eduqas examination paper 530004, June 2019

#3

R is proportional to $P\left(1-\frac{P}{100}\right)$.

When P is 50, R is 0·02.

(a) Find a formula for R in terms of P. [3]

(b) Find the positive value of P for which R is 0. [2]

Question taken from Eduqas examination paper 530004, June 2022

#4

A car driver is having a tyre replaced at Edutyres Garage.
The waiting time, t minutes, is inversely proportional to the square of the number of mechanics, m, working that day.

If there are 3 mechanics working, the waiting time is 38 minutes.

(a) Find a formula for t in terms of m. [3]

(b) The garage wants to reduce the waiting time to no more than 12 minutes.

What is the least number of mechanics that should be working to achieve this? [2]

Question taken from Eduqas examination paper 530004, November 2023

#5

y is inversely proportional to w^3.
w is directly proportional to the square root of x.

$y = \frac{1}{9}$ and $x = 4$ when $w = 6$.

Find a formula for y in terms of x in the form $y = mx^n$, where m and n are fractions in their simplest form. [7]

Question taken from Eduqas examination paper 530004, November 2024

Estimation: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	1	
#2	1	
#3	3	
Total	5	

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Marking Scheme

#1

GCSE (9-1) Mathematics **Component 1: Higher Tier**	**Mark**	**Comment**
(a) Valid explanation e.g. '$3^4 = 81$ (and $2.75 < 3$ and rounds to 3 to 1 sf)' or '$(2.75^4 < 3^4$ and) $3^4 = 81$'	B1	

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
(a) Answer in range 2 to 2.2 inclusive	B1	

#3

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
$\frac{8 \times 10}{0{\cdot}2}$ or better	M2	Award M1 for any one of the following: • sight of any TWO of 8, 10 or 0·2 • $\frac{2^3 \times \sqrt{100}}{0{\cdot}2}$
400	A1	CAO
	(3)	

Estimation: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
Total	3	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
(a) Any valid reason e.g. '10 years is too far ahead to predict' 'the paper might not be produced if sales continue to fall' 'the change each time is not consistent'	B1	If a satisfactory reason is given ignore further spurious comments. Allow e.g. 'because the sales may not follow the pattern of the graph' 'there is not an equal; drop in numbers sold every 5 years' 'it's too far in the future we cannot tell' 'it could increase instead of decrease' 'more people may read the paper on the internet' Do not allow statements that do not relate to the graph e.g. 'there might be more or less than 10 000 sold in 2025' as no reference to the trend 'we can't tell' as no reference to time or trend
(b) (52 000 000 ÷ (16 + 9) ×16 33 280 000	M1 A1	Allow a place value slip in 52 000 000 for M1 only Allow 33 000 000 and 33 300 000
	(3)	

Calculating with the Four Operations: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	6	
Total	6	

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eduqas Part of WJEC Question Bank

Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) (752 – 27 =) 725 725 ÷ 25 29	 B1 M1 A1	 FT 'their 752 – 27'
Alternative method 1: *752 ÷ 25* *30 remainder 2 or 30.08* *29*	 *M1* *A1* *A1*	
Alternative method 2: *At least two trials of 25 × n or 752 ÷ n, where n is greater than 20* *25 × 29 = 725* *29*	 *M1* *A1* *A1*	 *implies M1*
(b)(i) Valid explanation e.g. 'There are more guests so the food should not last longer.' or 'He has halved instead of doubling.' or 'The food will last for less time if there are more people.'	E1	'It is impossible' without further explanation is E0 Allow e.g. 'If you divide one side you have to multiply the other,' Do not allow e.g. 'You have to multiply not divide.' (too vague)
(b)(ii) 4 (days)	B2	B1 for a correct intermediate step e.g. 10 guests and 12 days or for $\frac{20\times6}{30}$ oe si
	(6)	

Using a Calculator: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	4	
Total	6	

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Marking Scheme

#1

Eduqas Summer 2018 C2 Higher Tier Update 130618	Mark	Comment
14625	B2 (2)	B1 for sight of $C = \frac{2340}{(52/A)^2}$ or $C = \frac{2340}{(52/130)^2}$ or $C = \frac{2340}{0.4^2}$ or $B = 0.16$

#2

	Mark	Comment
$13 \times 6 - 17^3$ or $26 \times 3 - 17^3$ or $39 \times 2 - 17^3$	B1	
1.34×232	B1	Do not accept 134% × 232
0.82×4530	B1	
-4835 and 310.88 and 3714.6	B1 (4)	CAO. Independent mark *Misreads: e.g. $5 \times 13 - 17^3 = -4848$ is B0, but FT as misread for possible final B1*

Fractions / Percentages as Operators: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

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eduqas Part of WJEC Question Bank

Marking Scheme

#1

	Mark	Comment
(a) $40\times5-40$ or 40×4 (=160)	M1	
160×0.3 or $160-160\times0.7$ oe	M1	FT 'their $40\times5-40$' or 'their 40×4'
(£) 48	A1	CAO; implies M1 M1 If no marks then SC1 for an answer of (£)20 or for an answer of (£)9.6(0)
Alternative method: *(social life =) 0.3 × 0.8 = 24%* *20% is (£)40 4% is (£)8* *(£) 48*	*M1* *M1* *A1*	*CAO; implies M1 M1*
(b) $\frac{48}{200}(\times100)$ or 0.3×0.8	M1	FT $\frac{\text{'their 48'}}{\text{'their 200'}}(\times100)$ provided of equivalent difficulty
24(%)	A1	FT
	(5)	

Calculating with Fractions: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	4	
Total	7	

created with
eduqas Part of WJEC Question Bank

Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
$\frac{11}{4}\times\frac{8}{5}$ or $\frac{22}{8}\div\frac{5}{8}$	M1	Do not accept $\frac{11}{4}\div\frac{5}{8}$ without further working
$\frac{22}{5}$ oe	A1	
$4\frac{2}{5}$	B1	FT conversion of 'their improper fraction' to a mixed number in its simplest form
	(3)	

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
$7+\frac{5}{20}+\frac{9}{20}$ or $\frac{105}{20}+\frac{49}{20}$ oe; si **and** $3+\frac{5}{20}-\frac{9}{20}$ or $\frac{105}{20}-\frac{49}{20}$ oe; si	M2	equivalents may be decimals 5.25 + 2.45 and 5.25 – 2.45 M1 for $5\frac{5}{20}+2\frac{9}{20}$ oe or $5\frac{5}{20}-2\frac{9}{20}$ oe or 5.25 + 2.45 or 5.25 – 2.45
$7\frac{7}{10}$ and $2\frac{4}{5}$	A2	CAO A1 for either or for a pair of correct, but unsimplified, answers
	(4)	

Reverse Percentages: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	3	
#3	3	
Total	8	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) (£)72	 B2	 B1 for 54 ÷ 3 x 4 OR 54 ÷ 0·75 oe

#2

Component 1: Higher Tier	**Mark**	
Use of 110% (of original price) is 8690	S1	e.g. $x \times 1.1 = 8690$
A calculation for an appropriate percentage of the original price e.g.(10% of original price is) $\frac{8690}{11}$ or (1% of original price is) $\frac{8690}{110}$ or (original price is) $\frac{8690}{1.1}$ oe	B1	Need not evaluate calculation but the calculation stated must be the correct one for the % claimed; may be in stages
(£)7900	B1	CAO; implies 3 marks
	(3)	

#3

Component 1: Higher Tier	Mark	Comment
$\frac{1008}{60} \times 100$ or $\frac{1008}{0.6(0)}$ or $\frac{1008}{6} \times 10$ or $\frac{10080}{6}$ oe (£)1680(.00)	M2 A1	M1 for one of the following: • $\frac{1008}{6}$ (=168) (Calculating 10% of original value) • $\frac{1008}{60}$ (=16.8) (Calculating 1% of original value) • $0.6 \times x = 1008$ oe
	(3)	

Reverse Percentages: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	4	
Total	7	

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eduqas Part of WJEC Question Bank

Marking Scheme

#1

Component 2: Higher Tier	Mark	Comment
(a) 95 % ≡ (£)1451.6(0)	B1	Accept any indication.
1451.6(0) ÷ 95 × 100	M1	Or equivalent e.g.1451.6(0) ÷ 0.95 *Note: This implies B1 M1.*
= (£)1528	A1	

#2

Eduqas Summer 2018 C2 Higher Tier Update 130618	Mark	Comment
For sight of 0.85 and 0.78 or 85% and 78% or equivalent	B1	May be embedded
(42.50 ÷ 0.85) ÷ 0.78 or equivalent	M2	M1 for sight of 42.50 ÷ 0.85 or 'an amount > 42.50' ÷ 0.78 or equivalent, or for (42.50 ÷ 85) ÷ 78 or other consistent place value error, or for sight of (pre final reduction price of) (£)50
(£) 64.10	A1	CAO. Must be to the nearest penny
	(4)	

Percentage Difference: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	2	
#3	3	
Total	7	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
(a) $\frac{6500-5720}{6500} \times (100)$ or $(1-\frac{5720}{6500})\times(100)$	M1	
$= 12(\%)$	A1	If no marks, award SC1 for an answer of 88%

#2

Component 2: Higher Tier	Mark	Comment
(b) $\frac{80}{32}(\times 100)$ or $2.5 (\times 100)$	M1	
$250(\%)$	A1	Mark final answer If no marks, award SC1 for an answer of 150(%) (using a profit of £48)

#3

Eduqas Autumn 2019 C2 Higher Tier	Mark	Comment
(a) $\frac{42.58 - 31.83}{31.83}$ (× 100) or equivalent 33.8 (%)	M1 A2	(= 10.75/31.83) A1 for 33(.77...%) or 34 (%)

Converting Between a Recurring Decimal and a Fraction: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	2	
#3	2	
#4	3	
#5	3	
#6	5	
#7	5	
#8	5	
#9	5	
Total	32	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
(d) $1000x = 83.\dot{8}\dot{3}$ and $10x = 0.\dot{8}\dot{3}$ or $100x = 8.3\dot{8}\dot{3}$ and $x = 0.0\dot{8}\dot{3}$ and attempt to subtract $\frac{83}{990}$	M1 A1	or equivalent ISW

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	**Mark**	**Comment**
(7)341·3̇4̇1̇ – (7)·3̇4̇1̇oe $\frac{7334}{999}$ oe or $7\frac{341}{999}$	M1 A1	 ISW
	(2)	

#3

Component 1: Higher Tier	**Mark**	**Comment**
10x = 3.4545…. and 1000x = 345.4545… with an attempt to subtract on both sides $\frac{342}{990}$ (= $\frac{19}{55}$)	M1 A1	Or x and 100x or equivalent. Or a complete alternative method. ISW An answer of $\frac{34.2}{99}$ gains M1 only
Alternative method *0.3 + 0.04545… =* $\frac{3}{10} + \frac{45.}{990}$ $\frac{342}{990}$ *(=* $\frac{19}{55}$ *)*	*M1* *A1*	 *ISW*
	(2)	

#4

Component 1: Higher Tier	Mark	
$100x - x = (3)21\cdot\dot{2}\dot{1} - (3)\cdot\dot{2}\dot{1}$ oe $\frac{318}{99}$ or $(3)\frac{21}{99}$ $3\frac{7}{33}$	M1 A1 A1	 May see unsupported $3\frac{21}{99}$ for M1A1
	(3)	

#5

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) $0.0\dot{4}\dot{5}$	B1	Allow 0.04545…
(b) $1000x - x = 5258.\dot{2}5\dot{8} - 5.\dot{2}5\dot{8}$ $\frac{5253}{999}$ ISW or $5\frac{258}{999}$	M1 A1	or equivalent or equivalent
	(3)	

#6

Component 1: Higher Tier	Mark	Comment
(a) No indicated or clearly implied and a correct answer seen (0.204545454 – 0.003 =) 0.201545454… or $0{\cdot}20\dot{1}5\dot{4}$ or D	B2	Allow $0{\cdot}20\dot{1}5\dot{4}$ without indication that A is incorrect B1 for 0.20154 without indication that A is incorrect
(b) Complete method e.g. x = 0. 1234234….1000x = 123.4234 or 10x = 1. 234234….10 000x = 1234.234 AND an attempt to subtract $\frac{1233}{9990}$ or $\frac{411}{3330}$ oe $\frac{137}{1110}$	M1 A1 A1	Or 10x and 10 000x Allow A1 for e.g. $\frac{123.3}{999}$ FT from M1A0 provided at least 1 stage of further working required
Alternative method for the first mark *(0.1 + 0.0234234…=)* *1/10 + 234/9990 oe*	*M1*	

#7

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) $0.41\dot{6}$	B1	
(b)(i) $100x = 127.2\dot{7}$ and $x = 1.2\dot{7}$ and attempt to subtract	M1	or equivalent
$\frac{126}{99}$ or equivalent	A1	Allow $1\frac{27}{99}$
(ii) $\frac{14}{11}\times\frac{14}{11}$ with an attempt to multiply	M1	or equivalent e.g. $\frac{126}{99}\times\frac{126}{99}$; FT 'their derived $\frac{126}{99}$,
$1\frac{75}{121}$	A1	CAO
	(5)	

#8

Component 1: Higher Tier	Mark	
(a) $0{\cdot}0\dot{3}\dot{7}$ ISW	B1	Allow 0·037037... or $0{\cdot}0\dot{3}\dot{7}$ or $0{\cdot}03\dot{7}0$
(b) $1000x - 10x = 1243{\cdot}4\dot{3} - 12{\cdot}4\dot{3}$ $(990x = 1231)$ oe, si; OR (1·2 plus) $1000x - 10x = 43{\cdot}4\dot{3} - 0{\cdot}4\dot{3}$ (1.2 plus) $(990x = 43)$ oe, si	M1	Allow for $100x - x = 124{\cdot}34\dot{3} - 1{\cdot}24\dot{3}$ $(99x = 123.1)$ oe, si
$\frac{1231}{990}$	A1	CAO; may be embedded e.g. $\frac{1231}{990}-\frac{8}{9}$; implies M1
$\frac{1231}{990}-\frac{880}{990}$	m1	STRICT FT 'their $\frac{1231}{990}$' or '$\frac{1188}{990}$ + their $\frac{43}{990}$'
$\frac{351}{990}$ oe, ISW	A1	CAO $\frac{39}{110}$
	(5)	

#9

Component 1: Higher Tier	Mark	Comment
(a) $0.16\dot{3}$	B1	Allow for 0.16363... provided no rounding or termination
(b) $1000x - x = 3712.7\dot{1}\dot{2} - 3.7\dot{1}\dot{2}$ oe, si	M1	
$\frac{3709}{999}$ ISW or $3\frac{712}{999}$ ISW	A1	
(c) $\frac{1}{18}+\frac{1}{5}$ oe	B1	Award no marks if the method for (b) is used to answer (c)
$\left(\frac{5}{90}+\frac{18}{90}=\right)\frac{23}{90}$ oe, ISW	B1	
	(5)	

Rules of Indices: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	2	
#3	3	
#4	4	
#5	5	
#6	5	
#7	5	
#8	5	
#9	5	
#10	7	
#11	9	
Total	52	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	Comment
(a) 9	B2	B1 for $(\sqrt[3]{27})^2$ or $\sqrt[3]{(27^2)}$

#2

Component 1: Higher Tier	Mark	Comment
(a) 32	B2	May be seen in stages. B1 for one of the following: • 2^5 • $(\sqrt[3]{8})^5$ • $\sqrt[3]{(8^5)}$ • $(2^3)^{5/3}$

#3

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
(b) 26	B1	
(c) 9	B2	final answer; **not from wrong working** B1 for final answer of 3^2

#4

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(b)(ii) 125	B2	B1 for 5^3
(b)(iii) 8	B2	not from wrong working; allow ±8 for B2 B1 for $4096^{\frac{1}{4}}$ or 2^3

#5

Component 1: Higher Tier	Mark	
(a) 5^7	B1	mark final answer
(b) $\left(\sqrt[4]{10000}\right)^3$ or $\sqrt[4]{10000^3}$ si 1000	B1 B1	First correct step implied by sight of 10^3 or $\sqrt[4]{1\ 000\ 000\ 000\ 000}$
(c) 7×10^n	B2	B1 for $49^{\frac{1}{2}} \times (10^{2n})^{\frac{1}{2}}$ or $\sqrt{49} \times (10^{2n})^{\frac{1}{2}}$ oe
	(5)	

#6

Component 1: Higher Tier	Mark	
(a) 13^5	B1	
(b) $\frac{1}{2}$	B2	B1 for sight of either: • $\left(\frac{1}{8}\right)^{\frac{1}{3}}$ • $\sqrt[3]{8^{-1}}$ oe
(c) $a = 2$, $b = 9$ OR $a = 10$, $b = 1$	B2	Allow embedded answers, provided not contradicted. B1 for one of the following: • $a = 2$ • $a = 10$ • $\left(\sqrt[a]{3}\right)^5$ oe • sight of $9\sqrt{3}$
	(5)	

#7

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) x^6	B2	B1 for sight of $\frac{x^9}{x^3}$ or x^{2+7-3} attempted, may be in stages
(b)(i) 2	B1	Not from wrong working
(b)(ii) 81	B2	B1 for sight of 3^4 oe or $\left(\sqrt[3]{27}\right)^4$ or $\sqrt[3]{(27^4)}$

#8

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
(b) 0.64	B3	B2 for $\frac{16}{25}$ or equivalent fraction or B1 for $\left(\frac{4}{5}\right)^2$ or $\left(\frac{25}{16}\right)^{-1}$ oe
(c) 343	B2	B1 for sight of 7^3 or $7 \times 7 \times 7$ or $\left(\sqrt{49}\right)^3$ or $\sqrt{49^3}$

#9

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) 125	B2	B1 for sight of 5^3 or for $\left(\frac{1}{125}\right)^{-1}$; allow for sight of $\frac{1}{5^3} = \frac{1}{125}$
(b) 64	B2	not from wrong working; B1 for 4^3 or for $\left(\sqrt[4]{256}\right)^3$
(c) 7	B1	Accept 7 to 7.2 inclusive
	(5)	

#10

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a)(i) $\frac{1}{3}$	B1	Accept $\pm\frac{1}{3}$
(a)(ii) 5	B2	B1 for $\frac{5^{10}}{5^9}$ or for $\frac{625}{125}$ or $5^4 \times 5^{-3}$ or equivalent
(b) $16a^4b^{12}$	B2	B1 for any 2 correct elements of the product e.g. $2^4a^4b^{12}$
(c) Any answer in the range (16 , 20)	B2	B1 for sight of $4^3 = 64$ or $5^3 = 125$ or $64^{\frac{2}{3}}$ or $125^{\frac{2}{3}}$ or equivalent or for $\left(\sqrt{16}\right)^3$ or $\left(\sqrt{25}\right)^3$
	(7)	

#11

	Mark	Comment
(a)(i) $\frac{5}{4}$ oe	B1	Accept e.g. 1.25, $\frac{10}{8}$ etc
(a)(ii) 5	B1	Accept ± 5
(a)(iii) Sight of $\left(\frac{1}{4}\right)^2$ or $\frac{1}{\sqrt[3]{4096}}$ oe $\frac{1}{16}$	B1 B1	Ignore attempts to convert the fraction to a decimal
(b) $3^4 \times \frac{3^0}{(3^3)^2}$ oe, si 3^{-2}	B1 B1	a final answer of $\frac{1}{9}$ or $\frac{1}{3^2}$ without wrong working implies first B1 only
(c) $125ab^{12}$	B3	Mark final answer B2 for any two elements of $125ab^{12}$ correct in their final answer e.g. 5^3ab^{12} or $\frac{125a^3b^{12}}{a^2}$ or B1 for any one element of $125ab^{12}$ correct in their final answer or for $\frac{5^3a^3b^{12}}{a^2}$ seen at some stage
	(9)	

Unit Conversion: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
Total	2	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	Comment
(a) 5:1	B2	B1 for one of the following: • 1500:300 OR 15:3 oe • 1:5 from clear, correct unit conversion If no marks award SC1 for 1:2 (from 150:300 or 15:30)

Unit Conversion: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	5	
#3	8	
Total	15	

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Marking Scheme

#1

Eduqas Autumn 2019 C2 Higher Tier	Mark	Comment
(b) (1016 – 907) ÷ 1000 or equivalent 0.109 (tonnes)	M1 A1	(=109 ÷ 1000) Mark final answer

#2

	Mark	Comment
100g = 0.22 pounds or 1 pound = (1 ÷ 2.2 =) 0.4545...kg	B1	May be embedded in working
½ pound or 8 ounces ≈ (100 ÷ 0.22) × 0.5 (g) or (1 ÷ 2.2) ÷ 2 (kg)	M1	Or equivalent Award of M1 implies award of B1 previously
227(.2727.... g) or 0.227(27... kg)	A1	
(£) 227(.2727....) × 11 ÷ 100 or (£) 0.227(27...) × 11 × 1000 ÷ 100	M1	FT use of 'their 227(.2727...)' provided at least 1 mark previously awarded
Answer in the range (£)24.97 to (£)25.00	A1	FT for a similar range from rounding or truncation to a whole number If final M0, A0 due to 200g or 300g considered following otherwise correct working, award SC1 for answers of £22 or £33 respectively *Alternative 1:* *(For) £11 gets 0.22 lbs (of steak)* *B1* *(Which is) 16 × 0.22* *M1* *= 3.52 oz* *A1* *(may be embedded)* *(8 oz costs) 8 × 11 ÷ 3.52* *M1 (FT16 × 0.22)* *= (£)25* *A1* *Alternative 2:* *(For) £110 gets 2.2 lbs (of steak)* *B1* *110 ÷ 2.2* *M1* *= (£)50 (per lb)* *A1* *(8 ounces costs) 50 ÷ 2* *M1* *= (£) 25* *A1*
	(5)	

#3

	Mark	Comment
(a) 86 AND 140	B1	
(b) (0) **-273.15** (100) **-173.15** (200) **-73.15**	B2	B1 for 1 correct entry or for all 3 negative entries with correct differences
(c) 320 kelvin to Celsius: working with 100 difference in both kelvin and Celsius	M1	e.g. sight of 20 + 26.85, 126.85 – 80, 320-273.15
46.85 (degrees Celsius)	A1	Look for response in the table Accept 46.8, 46.9, 47 Look for evidence in the table
Answer for Fahrenheit between 104 and 122 exclusive	B1	CAO, independent of all other marks Look for evidence in the table
Suitable calculation, e.g. • $104 + (6.85/10)\times 18$ • $122 - \frac{(10 - 6.85)}{10} \times 18$	m1	FT from rounding or truncation of 46.85 (Celsius) e.g. 7 tenths of 18 FT 'their derived 46.85 °C' provided M1 previously awarded
116(.33 Fahrenheit)	A1 (8)	Accept 116 (Fahrenheit)) from correct working

Best Buys: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
Total	2	

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Marking Scheme

#1

Eduqas Autumn 2018 Component 2 Higher Tier	Marks	Comments
Method to compare, e.g. sight of • 1ml of each sight of 49 ÷ 87.5 and 72 ÷ 125 • Per 1p sight of 87.5 ÷ 49 and 125 ÷ 72 • Using 49p for 87.5ml sight of 49 × 125 ÷ 87.5 • Using 72p for 125ml sight of 72 × 87.5 ÷ 125	M1	
Accurate comparison calculated with a conclusion 87.5ml tube is better value Examples of evaluations: • 1ml is 0.56(p) and 0.576(p) • Per 1p is 1.78(5...ml) and 1.73(6..ml) • 49p for 87.5ml gives 70(p) for 125ml • 72p for 125ml gives 50.4(p) for 87.5p	A1 (2)	If units are given they must be correct Allow reasonable rounding or truncation for comparison Allow 0.576(p) given as 0.57(p) or 0.58(p) Allow 1.78(5...ml) given as 1.78(ml) or 1.79(ml) and 1.73(6..) given as 1.73 or 1.74 Allow 50.4(p) given as 50(p)

Exchange Rates: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	4	
Total	7	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	
Both to £: 110 × 0.9(0) oe or 99 **and** 125 ÷ 1.25 oe or 100 OR € to £ and £ to $: 110 × 0.9(0) oe or 99 **and** 99 ×1.25 oe or 123.75 OR $ to £ and £ to €: 125 ÷ 1.25 oe or 100 **and** 100 ÷ 0.9(0) oe or 111.11…	M2	Allow e.g. 1.25 × 100 = 125 for 125 ÷ 1.25; Allow M2 for e.g. 110 × 0.9(0) and 110 × 0.9(0) × 1.25 or 125 ÷ 1.25 and (125 ÷ 1.25) ÷ 0.9(0) (may be in stages) M1 for 110 × 0.9(0) oe or 99 or 125 ÷ 1.25 oe or 100 si
Germany indicated with (£)99 and (£)100 seen OR (£)99 and ($)123.75 seen OR (£)100 and (€)111.11 seen	A1	Allow $123(...) OR $123 or $124 from correct working Allow €111(...)
	(3)	

#2

Component 1: Higher Tier	Mark	
65 × 0.8(0) oe (£)52 52 × 1.2(0) oe (€)62.4(0) and online indicated	M1 A1 M1 A1	FT 'their 65 × 0.8(0)' Airport / Online £: 52 / 50 $: 65 / 62.5(0) €: 62.4(0) / 60
Alternative method 1 *65 × 0.8(0) oe* *(£)52* *60 ÷ 1.2(0) oe* *(£)50 and online indicated*	*M1* *A1* *M1* *A1*	
Alternative method 2 *60 ÷ 1.2(0) oe* *(£)50* *50 ÷ 0.8(0) oe* *($)62.5(0) and online indicated*	*M1* *A1* *M1* *A1*	*FT 'their 60 ÷ 1.2(0)'*
	(4)	

Exchange Rates: Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
825 × 6.27 = 5172.75 (R$) 5150 (R$)	M1 A1 A1	 FT 'their 5172.75' rounded down to the nearest 50 provided M1 previously awarded Sight of 5150 (R$) with no incorrect working implies M1 A1 A1
5150 ÷ 6.27	M1	Strict FT 'their 5150' provided a multiple of 50 If 5150 not seen award M1 and the previous A1 for 103 × 50 ÷ 6.27
= (£) 821.37 ISW	A1	FT Answer must be correct to the nearest penny If final M0 A0, then award a further SC1 for (£)3.63 (left) or similar FT
Alternative method *825 ÷ (50 ÷ 6.27)* *=103.4(5….)* *(103 × 50 =) 5150*	 *M1* *A1* *A1*	 *Award M1 A0 for 825 ÷ 7.97 = 103.5…* *FT 'their 103(….) × 50 ' provided 'their 103(….)' has been rounded down and M1 previously awarded*
5150 ÷ 6.27	*M1*	*Strict FT 'their 5150' provided a multiple of 50* *If 5150 not seen, award M1 and the previous A1 for 103 × 50 ÷ 6.27*
= (£) 821.37 ISW	*A1*	*FT Answer must be correct to the nearest penny* *If final M0 A0, then award a further SC1 for (£)3.63 (left) or similar FT*
	(5)	

Product of Prime Factors: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	5	
#4	5	
#5	5	
Total	21	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	Comment
(a)		
Method to find prime factors with two correct prime factors seen before the second error	M1	Must be a method of 'repeated division'
2, 3, 3, 7, 7	A1	CAO for sight of 5 correct factors – may be indicated in 'tree' or 'ladder'. (Ignore 1s)
$2 \times 3^2 \times 7^2$	B1	FT 'their derived primes' provided at least one index form used with at least one square. Do not FT non-primes. Allow $(2)(3^2)(7^2)$ and $2.3^2.7^2$ Do not allow $2,3^2,7^2$. Inclusion of 1 as a factor gets B0.

#2

	Mark	Comment
(a) 1	B1	May be embedded
(b) Method to find prime factors with two correct prime factors seen before the second error	M1	Ignore 1's; the two prime factors may be correct or correct FT after one error
$2 \times 2 \times 2 \times 3 \times 7$ oe	A1	ISW

#3

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) Method to find prime factors with two correct prime factors seen before the second error	M1	
2, 2, 2, 2, 5	A1	Ignore 1's
$2^4 \times 5$	B1	Implies all 3 marks
(b) 24 336	B2	B1 for $2^4 \times 3^2 \times 13^2$ or 8112×3
	(5)	

#4

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) Method to find prime factors with two correct prime factors seen from the set {3, 3, 5, 5, 11} before the second error. 3, 3, 5, 5, 11 $3^2 \times 5^2 \times 11$	M1 A1 B1	Note: 2475 = 3 x 825 or 5 x 495 or 11 x 225 or 15 x 165 or 25 x 99 C.A.O. Ignore 1s. Primes may only be seen in factor tree. FT 'their derived primes' provided at least one index form used with at least one square. Do not FT non-primes. Allow $(3^2)(5^2)(11)$ and $3^2.5^2.11$ Do not allow $3^2,5^2,11$. Inclusion of 1 as a factor gets B0.
(b) $2^3 \times 5^2 \times 7^2$	B2	B1 for sight of • $8 \times 5^2 \times 7^2$ • $8 \times 25 \times 49$
	(5)	

#5

Component 1: Higher Tier	Mark	
(a) Method to find prime factors with two correct prime factors seen	M1	Implied by 2, 3, 3, 3, 7; ignore 1s
2, 3, 3, 3, 7	A1	CAO. For sight of the 5 correct factors (Ignore 1's); may be in e.g. a factor tree
$2 \times 3^3 \times 7$	B1	FT 'their derived primes' provided at least one index form used with at least a square **dep** on M1 previously awarded Allow $(2)(3^3)(7)$ and $2.3^3.7$ Inclusion of 1 as a factor gets B0.
(b) $378 = 2 \times 3^3 \times 7$ or 2, 3, 3, 3, 7 **AND** $275 = 5 \times 5 \times 11$ or finds prime factors of 275 as 5, 5, 11 OR shows that 2, 3 and 7 are not factors of 275 OR shows that 5 and 11 are not factors of 378 **AND** a valid comment e.g. 'They have no prime factors in common' oe	B2	$378 = 2 \times 3^3 \times 7$ or 2, 3, 3, 3, 7 may be seen in (a) Valid comments: **allow** e.g. 'They have no factors in common (except 1).' *or 'They only have 1 in common'*; **do not allow** e.g. '1 is the only common prime factor' B1 for partially correct proof e.g. • $275 = 5 \times 5 \times 11$ OR • Showing/stating that 2, 3 and 7 are not factors of 275 OR • Showing/stating that 5 and 11 are not factors of 378
	(5)	

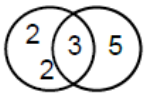
LCM / HCF: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	3	
#3	4	
#4	5	
#5	5	
Total	19	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a)* (soup =) 5 (water =) 4	B2	B1 for sight of 3×4 and 3×5 or equivalent or for (LCM =) 60 or for a correct Venn diagram of primes factors  or for 4 and 5 (values reversed) or for answers of $5n$ and $4n$ where n is an integer > 1

#2

	Mark	Comment
(c) Attempts to find a common factor of 168 and 120	S1	e.g. May list some of the factors of both 168 and 120 or draw a Venn diagram with the factors of 168 and 120 correctly positioned
Finds at least one common factor of 168 and 120 greater than 3	M1	FT 'their (a) and their (b)' 4, 6, 8, 12, 24
24	A1	CAO; mark final answer

#3

Component 1: Higher Tier	Mark	Comment
(b)(i) a^2bc^2	B1	
(b)(ii) $a^3b^3c^3$	B1	
(c) p = 3 q = 2 r = -3	B2	All three correct B1 for any two correct

#4

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
		Mark whichever method is to the candidate's advantage
Attempts to find a common factor of at least two of 140, 56 and 280	S1	Allow slips if the intention is clear. e.g. May list some of the factors of e.g. both 140 and 56 or 280, or all list factors of all 3 values or calculations, using factors, such as 140 ÷ 14 = … **and** 56 ÷ 14 = … or 28 × 5 = 140 **and** 28 × 2 = 56 or 280 ÷ 56 = 5 or 280 ÷ 140 = 2 or attempt to find the prime factorisation of two of the numbers $140 = 2^2 \times 5 \times 7$, $56 = 2^3 \times 7$, $280 = 2^3 \times 5 \times 7$ or draw a Venn diagram with the prime factors of any two numbers correctly positioned
Finds at least one common factor, greater than 1, of all three numbers	M1	2, 4, 7, 14, 28; may be embedded in calculations e.g. 28 × 5 = 140, 28 × 2 = 56, 28 × 10 = 280
28 (bags)	A1	CAO
Uses a common factor that is greater than 4 to find the number of each item	M1	NB 7: 20, 8, 40 14: 10, 4, 20
5 (vouchers), 2 (pencils), 10 (sweets)	A1	CAO
Alternative method: *Forms the ratio 140 : 56 : 280 and attempts to simplify*	*S1*	*Values in ratio could be in any order.* *e.g. finds a simplified form with 2 values correct*
Finds a simplified form of 140 : 56 : 280	*M1*	*e.g. 70 : 28: 140*
(5 : 2 : 10 therefore) 5 (vouchers), 2 (pencils), 10 (sweets)	*A1*	*CAO*
Finds 140 ÷ 5 or 56 ÷ 2 or 280 ÷ 10	*M1*	*FT 20: 8: 40 or 10: 4: 20 only; may be in stages*
28 (bags)	*A1*	*CAO*
	(5)	

#5

Component 1: Higher Tier	Mark	Comment
(a) For a correct method that produces two prime factors from the set {2, 2, 2, 3, 3, 7} before the second error.	M1	Must be a method that involves only division.
2, 2, 2, 3, 3, 7	A1	CAO for sight of the six correct factors (ignore 1s) FT provided of equivalent difficulty (e.g. must be at least two 3s)
HCF = 126	B2	B1 for 2 × 3 × 3 × 7 oe 126 on answer space implies M1A1B2 If no marks, award SC1 for a common factor > 9
(b) 14	B1	
	(5)	

LCM / HCF: Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

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Marking Scheme

#1

Eduqas Autumn 2018 Component 2 Higher Tier	Marks	Comments
(b) (72 ÷ 24 =) 3 (bags of spoons) AND (72 ÷ 18 =) 4 (boxes of forks)	B3	Answers in the table take precedence over working B2 for any of the following: • (least amount to buy) 72 • the correct number of bags and boxes for 'their number of common multiples' found from making only 1 error in listing B1 for any of the following: • 24 = 6 × 4 and 18 = 6 × 3, or similar provided the factors are broken down sufficiently to be able to find the LCM • the correct number of bags and boxes for 'their number of common multiples' found from making 2 errors in listing
(3 × 19.95 and 4 × 15.55 =) (£) 59.85 AND (£) 62.2(0)	M1	FT use of 'their 3 bags of spoons' and 'their 4 boxes of forks' provided at least B1 previously awarded
= (£) 122.05	A1	CAO

Speed / Distance / Time: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
(a) $1.35 \leq s < 1.45$	B2	Allow e.g. $1.35 \leq \text{speed} < 1.45$ or $1.35 \leq x < 1.45$ B1 for sight of 1.35 and 1.45 or for appropriate sight of one of these in an inequality of the form ... $\leq s <$ ... NB 1.35 ≤ 1.4 < 1.45 is B1 only
(b) $\frac{15}{25} \times 60$ or equivalent 36 (mph)	M2 A1	May be in stages; Accept a correct and complete build-up method for M2 e.g. 25 mins for 15 miles ÷5 ÷5 5 mins for 3 miles ×12 ×12 M1 for a correct distance ÷ speed calculation e.g. $\frac{15}{25}$ seen or for one correct stage in a build-up method e.g. 25 mins for 15 miles ÷5 ÷5 5 mins for 3 miles
	(5)	

Speed / Distance / Time: Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	4	
#3	5	
Total	13	

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Marking Scheme

#1

Component 2: Higher Tier	Mark	Comment
27 × 1.5 oe	M1	Allow 27 × 1.3
40.5	A1	CAO May be implied in total distance (51) later.
$\frac{1.5+40.5+9}{0.75+1.5+1}$ $\left(=\frac{51}{3.25}\right)$	m1	Must be using km and hours FT 'their 40.5' Allow m1 but AO for $\frac{1.5+their\ 40.5+9}{3.15}$
15.6(9..) or 15.7 km/h (< 16.1 km/h)	A1	FT provided the answer is less than 16.1
Alternative method 1 for final 2 marks *(winning time =)* $\frac{1.5+40.5+9}{16.1}$ *oe*	*m1*	*FT 'their 40.5' including the correct use of 1.3 hours*
3.1(6...) (hours) < 3.25 (hours)	*A1*	*A0 unless the 3.25 hours seen*
Alternative method 2 for final 2 marks *(Possible distance travelled by winner =) 16.1 × 3.25 AND* *(Length of race =) 1.5 + 40.5 + 9* *52(.325 (km) > 51 (km)*	*m1* *A1*	*FT 'their 40.5'*
	(4)	

#2

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
(7·3 × 60 ÷ 50) – (7·3 × 60 ÷ 70)	M3	May be seen in stages Allow M3 for (7·3 × 60 ÷ 70) – (7·3 × 60 ÷ 50) M2 for 7·3 ÷ 50 - 7·3 ÷ 70 (=0·146 - 0·104..= 0·0417… or 0·042) may be embedded in other calculations OR 7·3 x 60 ÷ 50 (=8.76 min) OR 7·3 × 60 ÷ 70 (= 6.257… min) M1 for 7·3 ÷ 70 (=0·104..) OR 7·3 ÷ 50 (=0·146)
2·5 (mins)	A1	CAO
	(4)	

#3

	Mark	Comment
(First distance) 45 × 40 ÷ 60	M1	(30 miles)
(Second distance) 60 × 25 ÷ 60	M1	(25 miles)
(Total distance) 55 (miles)	A1	CAO. May be implied in further working
(Overall average speed) 55 ÷ (65/60) or equivalent in stages	m1	FT 'their 55' depends on M1 previously awarded and 'their total distance' is the sum of two derived distances
50.7(69...mph) or 50.8(mph) or 51(mph)	A1	If no marks, award SC2 for an answer of 50.7(69...) from (45×40 + 25×60)/(40 + 25) or equivalent
	(5)	

Pressure / Force / Area: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	5	
Total	8	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	Comment
(b) (Total force =) 1600 × 0.1 160 (N)	 M1 A1	
(c) Valid impact e.g. 'The force would be less'	 E1	 Ignore any extraneous comments e.g. 'The pressure would increase, and the force will be lower'.

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	**Mark**	**Comment**
(Total Force =) 54 (newtons) si	B1	
(Total area = 3 × 6 =) 18 (cm^2) si	B2	B1 for 3 × 2 × 3 or 6(cm^2) si or for sight of 'their area of one foot' × 3
(Pressure =) 54 ÷ 18	M1	May be seen in stages e.g. 54 ÷ 3 ÷ 6 FT 'their 54' and 'their 18', providing at least 34 + 20 and 3 × 2 × 3 attempted NB 54 ÷ 6 ÷ 3 also implies B2 (Common answer 54 ÷ 6 = 9 earns B1 B1 M0 A0, 2 marks)
3 (N/cm^2)	A1	FT
	(5)	

Pressure / Force / Area: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	4	
#3	4	
Total	11	

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Marking Scheme

#1

	Mark	Comment
(b) (P =) 135 ÷ 0.36 or (135 ÷ 3600) × 100^2	M2	or equivalent full method which may be seen in stages M1 for 135 ÷ 3600 or 135 ÷ 'digits 36 with incorrect place value'
375 (N/m^2)	A1	CAO

#2

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
(Force =) 0.97 × π × 24^2 = 0.97 1809.557	M3	May be seen in stages M2 for 0.97 = $\frac{Force}{\pi \times 24^2}$
0.97 = Force/(3619.11..) gains the M1 (Force =) 0.97 × 3619.11..		If not M2, award M1 for one of the following: • 0.97 = Force/(k x π × 24^2) where k is an integer > 1 • (Force =) 0.97 × k x π × 24^2 where k is an integer > 1 • sight of (Area of base =) π × 24^2
Answers in the range 1754 to 1756	A1	CAO Award A0 if the answer is given as a multiple of π
	(4)	

#3

Component 2: Higher Tier	Mark	Comments
(a)		
$\frac{675}{45\times60}$ oe	M1	
0.25 (N/cm^2)	A1	
(b)		
0.75 × (45 × 60) or 675 × 3	M1	FT 'their 2700' from (a) if necessary
2025 (N)	A1	
	(4)	

Density / Mass / Volume: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	5	
Total	8	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	Comment
700 × 7.5 5250 (g) or 5.25 kg AND No indicated or clearly implied	M1 A1 A1	 CAO FT 'their 700 x 7.5'.
Alternative method 1 $\frac{5 \times 1000}{700}$ *7·1(… cm³)* *No indicated or clearly implied*	 *M1* *A1* *A1*	 *CAO* *FT 'their* $\frac{5 \times 1000}{700}$*'*
Alternative method 2 $\frac{5 \times 1000}{7·5}$ *666·6(… cm³) or 666·7 (cm³)* *No indicated or clearly implied*	 *M1* *A1* *A1*	 *CAO* *FT 'their* $\frac{5 \times 1000}{700}$*'*
	(3)	

#2

Component 1: Higher Tier	Mark	
(Original depth of liquid =) 5400 ÷ 0·9 ÷ (20 × 20) × $\frac{2}{3}$ 10 (cm)	M1 M1 M1 A2	Method marks may be awarded in any order Award A1 for sight of any ONE of the following: • (5400 ÷ 0·9 =) 6000 • (5400 × $\frac{2}{3}$ =) 3600 • (5400 ÷ (20 × 20) =) 13.5 • Two correct evaluations, following an initial error e.g. 5400 ÷ 0·9 = 600, 600 ÷ 400 × $\frac{2}{3}$ = 1.
Alternative method *Let original depth = x* *20 × 20 × 1.5x (= 600x)* *0.9 = $\frac{5400}{600x}$ (= $\frac{9}{x}$)* *x = 10 (cm)*	*M2* *M1* *A1* *A1*	*M1 for 20 × 20 × h (= 400h)* *M1 for 0.9 = $\frac{5400}{\text{'their volume'}}$*
Alternative method 2 *Let final depth = h* *20 × 20 × h (= 400h)* *0.9 = $\frac{5400}{400h}$* *(original depth =) h × $\frac{2}{3}$* *10 (cm)*	*M1* *M1* *A1* *M1* *A1*	*M1 for 0.9 = $\frac{5400}{\text{'their volume'}}$*
	(5)	

Density / Mass / Volume: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	4	
#3	4	
#4	4	
#5	5	
Total	19	

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Marking Scheme

#1

	Mark	Comment
(a) (Mass =) 2.4 × 13.4 32.16 (g)	M1 A1	CAO, accept 32.2(g) from correct working

#2

Component 2: Higher Tier	Mark	Comment
		Answer space takes precedence
8.96 × 1540 ÷ 1000	M2	M1 for 8.96 × 1540 (= 13798.4) Allow M1 for digits 896 × 1540 if incorrect mass unit conversion seen first
= 14 (kg)	A2	A1 for 13.7(98…) or 13.8 (kg) FT from M1 to award: A2 for an answer of 14000 Allow A2 for a correct FT answer with 14 as the only non-zero digits from a seen incorrect unit conversion A1 for an answer of 13798(.4) or 13800 Allow A1 for either of the following: • 13798(.4) seen and then spoiled e.g 13000 • a correct FT answer with 1379(84) or 138 as the only non-zero digits e.g. 138, 0.01379 from a seen incorrect unit conversion If no marks award SC1 for a calculation of: a number with only non-zero digits of 896 × a number with only non-zero digits of 154 e.g. 0.0896 × 1.54
	(4)	

#3

Component 2: Higher Tier	Mark	Comment
(b) 8.1 × 7.3 × 4	M1	(Volume = 236.52 cm^3) The following two marks can be awarded in any order.
× 10.49	m1	(Total mass = 2481.0948 g or
÷ 200	m1	Volume of one piece = 1.1826 cm^3)
= 12.4 (05..) (g)	A1	Allow 12g from correct working

#4

Eduqas Summer 2018 C2 Higher Tier Update 130618	Mark	Comment
12 × 10.48 ÷ 19.32 (=6.509… g)	M2	M1 for 12 ÷ 19.32 (= 0.6211…)
12 – 6.5(….)	M1	Accept 6.5(…) – 12 FT 'their 12 × 10.48 ÷ 19.32' provided < 12 CAO, allowing also a negative difference
5.49(06….g) or 5.5 (g)	A1	
	(4)	

#5

Eduqas Autumn 2019 C2 Higher Tier	Mark	Comment
Inner cuboid (62-2-2) × (48-2-2)×4	B1	**Accept equivalents in cm throughout**
Volume 62 × 48 × 4 - (62-2-2) × (48-2-2)×4 (11904 – 10208 mm^3)	M1	FT 'their inner cuboid volume' provided ≠ 62 × 48 × 4
1.696 (cm^3)	m1	
Mass 1.696 × 10.49 OR Density 18 ÷ 1.696	M1	FT 'their 1.696'
Mass 17.7(9... g) 17.8 (g) or 18 (g) OR Density 10.6(13... g/cm^3) or 11 (g/cm^3)	A1	CAO *Alternative: treated as one long cuboid of metal* *Overall length (2×(48 +62)=) 220(mm) B1* *Volume of cuboid:* *2×(48 +62) × 2 × 4 (= 1760 mm^3) M1* *1.76(0 cm^3) m1* *Mass OR density: FT 'their 1.76'* *Mass 1.76 × 10.49* *OR Density 18 ÷ 1.76 m1* *Mass 18(.46...g)* *OR Density 10.2(2.... g/cm^3) A1 CAO*
	(5)	

Proportional Rates: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	3	
#4	5	
#5	6	
Total	20	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	
2(h) or 120 (min) × 6 ÷ 3 ÷ 8 oe OR (8 machines 3000 ÷ 2 ÷ 6 × 8 =) 2000 erasers per hour or better ½ (hour) or 30 (mins)	M2 A1	Operations may be done in any order and in stages For complete correct method e.g. $\frac{2}{3} \div \frac{4}{3}$ or $\frac{2}{3} \times \frac{3}{4}$ M1 for partial correct method using time and using any two correct operations and no wrong operations OR M1 for 3000 ÷ 2 ÷ 6 × 8 or 3000 ÷ 120 ÷ 6 × 8 oe If units are given they must be correct
Alternative method *Complete method e.g.* *Machines / Erasers / Hours* *6 / 3000 / 2* *2 / 1000 / 2* *8 / 1000 / ½* *or* *Machines / Erasers / Hours* *6 / 3000 / 2* *8 / 4000 / 2* *8 / 1000 / ½* *½ (hour) or 30 (mins)*	*M2* *A1*	*Correct step(s) to 1000 and correct step(s) to 8 or e.g.* *Machines / Erasers / Hours* *6 / 3000 / 2* *1 / 500 / 2* *1 / 250 / 1* *and (time needed is to make)1000 ÷ 8 = 125 (erasers per machine) oe* *M1 for finding 1 machine makes 250 erasers per hour or (time needed is to make)1000 ÷ 8 = 125 (erasers per machine) or any one correct step* e.g. *Machines / Erasers / Hours* *6 / 3000 / 2* *1 / 500 / 2* *If units are given they must be correct*
	(3)	

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
36 $\times \frac{6}{9}$ oe $\times \frac{1}{2}$ 12 (minutes)	 M1 M1 A1	A table method altering all 3 values in the same ratio at the same time is M0 M marks may be seen in either order e.g. Printers 9, Booklets n, Time 24 **FT from M0 previously awarded** Must be from use of 36 e.g. if this calculation is performed first Printers 6, Booklets 0.5n, Time 18 CAO
Alternative method 1 *Printers first then booklets* ***Printers*** / ***Booklets*** / ***Time*** *6* / *n* / *36* × 1.5 / × 1.5 / *9* / *1.5n* / *36* / ÷ 3 / ÷ 3 *9* / *½ n* / *12*	 *M1* *M1* *A1*	*Note: the number of booklets may be an assumed number* FT 9 and 'their 36' CAO
Alternative method 2 *Booklets first then printers* ***Printers*** / ***Booklets*** / ***Time*** *6* / *n* / *36* ÷ 2 / ÷ 2 / *3* / *½ n* / *36* × 3 / / ÷ 3 *9* / *½ n* / *12*	 *M1* *M1* *A1*	*Note: the number of booklets may be an assumed number* FT *½ n* and 'their 3' CAO
Alternative method 3 *(using 1 printer)* ***Printers*** / ***Booklets*** / ***Time*** *6* / *n* / *36* ÷ 6 / / × 6 *1* / *n* / *216* × 9 / / ÷ 9 *9* / *n* / *24* / ÷ 2 / ÷ 2 *9* / *½ n* / *12*	 *M1* *M1* *A1*	*Note: the number of booklets may be an assumed number* *Two steps needed for M1* FT 9 and 'their 24' CAO
Alternative method 4 *(using 1 printer)* ***Printers*** / ***Booklets*** / ***Time*** *6* / *n* / *36* ÷ 6 / / × 6 *1* / *n* / *216* / ÷ 2 / ÷ 2 *1* / *½ n* / *108* × 9 / / ÷ 9 *9* / *½ n* / *12*	 *M1* *M1* *A1*	*Note: the number of booklets may be an assumed number* *Two steps needed for M1* FT *½ n* and 'their 108' CAO
	(3)	

#3

Component 1: Higher Tier	Mark	Comment
$2 \times \frac{2}{8.} \times \frac{9}{3}$ or $2 \div 4 \times 3$ oe	M2	May be seen in stages. Candidates might work in minutes. M1 for one step, e.g. • $2 \div 4$ (0·5 hours) • 2×3 (6 hours) oe
1.5 hours oe	A1	CAO
Alternative method 1 ***Pumps*** / ***Tanks*** / ***Time*** *9* / *8* / *2* *÷ 3* / / *× 3* *3* / *8* / *6* / *÷ 4* / *÷ 4* *3* / *2* / *1.5*	*M1* *M1* *A1*	*Method to find tanks and time for 3 pumps.* *Method to find time for 2 tanks. FT.* *CAO*
Alternative method 2 ***Pumps*** / ***Tanks*** / ***Time*** *9* / *8* / *2* *÷ 9* / / *× 9* *1* / *8* / *18* / *÷ 4* / *÷ 4* *1* / *2* / *4.5* *× 3* / / *÷ 3* *3* / *2* / *1.5*	*M1* *M1* *A1*	*Method to find tanks and time for 1 pump.* *Method to find tanks and time for 3 pumps. FT.* *CAO*
Alternative method 3 ***Pumps*** / ***Tanks*** / ***Time*** *9* / *8* / *2* / *÷ 8* / *÷ 8* *9* / *1* / *¼* *÷ 3* / / *× 3* *3* / *1* / *¾* / *× 2* / *× 2* *3* / *2* / *1.5*	*M1* *M1* *A1*	*Method to find pumps and time for 1 tank.* *Method to find pumps and time for 2 tanks. FT.* *CAO*
	(3)	

#4

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
5 park keepers pruning after 1 hour	B1	seen or implied
10 trees left to prune	B1	seen or implied
Fully correct method in steps or statements e.g. P/keepers | Hours | Trees 3 | 2 | 6 1 | 2 | 2 5 | 2 | 10	M1	seen or implied; FT 'their derived 10' or $2\times\frac{3}{5}\times\frac{10}{6}$ Allow equivalent working in minutes
2 (hours)	A1	Seen or implied
3 (hours)	A1	FT 'their 2' provided M1 has been awarded
	(5)	

#5

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) (£) $2500\times\frac{6}{5}\times\frac{3}{2}$ or equivalent	M2	Allow for sight of 6 waiters earn £1500 for 1 week or 1 waiter earns £750 for 3 weeks M1 for (£)$2500\times\frac{3}{2}$ or (£)$2500\times\frac{6}{5}$ or equivalent or for $\frac{2500}{5\times2}$ or for sight of (1 waiter earns) (£)250 (per week)
(£) 4500	A1	
(b)(i) (£ per hour =) $\frac{m}{5x}$	B1	Accept unsimplified e.g. $\frac{m\div5}{x}$
(b)(ii) (£) $7\left(\frac{m}{5x}+y\right)$ or equivalent, ISW	B2	FT 'their (b)(i)' B1 for sight of 'their $\frac{m}{5x}$'$+y$
	(6)	

Conversion Graphs: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	5	
Total	5	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier		Mark	Comment
(a)	(£)18(.00)	B1	
(b)(i)	They are in direct proportion indicated	B1	
(b)(ii)	4.5	B2	B1 for $\frac{45}{10}$ or equivalent
	The cost (in £) per mile	B1	or equivalent Allow £ per mile NB An answer of £4.5(0) per mile earns 3 marks
		(5)	

Conversion Graphs: Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	7	
Total	11	

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Marking Scheme

#1

	Mark	Comment
(a) Method to find the rate, e.g. 7.5 cm per hour, or 1.25 cm per 10 minutes 0.125 (cm/min)	M1 A1	
(b)(i) 20 (cm) or 200 (mm)	B1	CAO. If units are given they must be correct
(b)(ii) Statement, e.g. 'container might overflow', 'may not continue at the same rate', 'cross section of the container might change'	E1 (4)	

#2

Eduqas Summer 2018 C2 Higher Tier Update 130618	Mark	Comment
(a) 2 £(s)/person	B1 U1	Accept answers in the range 1.9 to 2.1 Allow £(s) per person or pounds per person Do not accept £/people (singular is needed for people), or charge per person
(b)(i) Correct graph with points connected, for 0 people £60 to 200 people £660	B2	B1 for 0 people costing £60 shown OR B1 for a straight line with a gradient of 3
(b)(ii) $t = 3(\times)p + 60$	B1	CAO, not FT
(c) 20 (people) (£) 120	 B1 B1 (7)	Allow tolerance of ½ small square FT from 'their line' FT from 'their line'

Scale Factor / Diagram: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
Total	2	

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Marking Scheme

#1

Eduqas Autumn 2018 Component 2 Higher Tier	Marks	Comments
2.2 × 25 000 (cm) (= 55 000 cm)	M1	Allow for sight of 55000, ignoring any units given
0.55 (km)	A1 (2)	CAO *Alternative:* *1 cm (= 250 m =) 0.25* ***km*** *or ¼* ***km*** *B1* *(¼ × 2.2 =) 0.55(km) B1*

Ratio: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	3	
#3	3	
#4	3	
#5	3	
#6	4	
#7	4	
#8	4	
#9	4	
#10	4	
#11	5	
#12	8	
Total	47	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	Comment
$2 \times 330 \div (1 + 2 + 7)$	M1	May be seen in stages. Full method required
66 (ml)	A1	
	(2)	

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) $\frac{7}{12}$	B1	Allow for any equivalent fraction e.g. $\frac{84}{144}$
(b) $\frac{300}{12} \times 2$ oe	M1	FT 'their 2 + 3 + 7' from part (a); allow recovery of 12 here even if a different denominator in (a)
50 (ml)	A1	FT 600 ÷ (their 2 + 3 + 7)
	(3)	

#3

Component 1: Higher Tier	Mark	
(a) $\frac{7}{15}$	B1	Accept equivalent fractions.
(b) $\frac{60}{15} \times 3$ or $\frac{60}{15} \times 5$ or $\frac{60}{15} \times 7$ si	M1	FT 'their 3 + 5 + 7' from (a).
12 (cm), 20 (cm), 28 (cm)	A1	FT. Two correct answers imply M1. May be seen in any order.
	(3)	

#4

Component 1: Higher Tier	Mark	Comment
8 parts are red	B2	B1 for 0.4 × 20 oe or writing a ratio 8 : 12 (: 21) or 12 : 8 (: 21)
$\frac{8}{41}$	B1	CAO
	(3)	

#5

Component 1: Higher Tier	Mark	Comment
(a) 9.6 ÷ 12 (= 0.8) 0.8 ÷ 8 × 3 0.3 (kg) or 300g	 M1 M1 A1	 FT 'their 0.8' including place value error from conversion of kg to g CAO
Alternative method *88 : 3 : 5* $\frac{3}{88+3+5}\times 9.6$ *0.3 (kg) or 300g*	 *B1* *M1* *A1*	 *CAO*

#6

Component 1: Higher Tier	**Mark**	
(a) 6 parts = 48 or 48 ÷ 6 or $13x - 7x$ = 48 oe (1 part =) 8 oe, si (Total =) 8 × (13 + 7 + 2) or (Total =) 104 + 56 + 16 176	 M1 A1 m1 A1	 Accept '$\frac{6}{22}$ is 48 ' oe; for 'their 8' × 'their (13 + 7 + 2)' or for 'their 8'× 13 + 'their 8' × 7 + 'their 8' × 2 or for sight of any two of 104 or 56 or 16 FT 'their 8'
Alternative method *e.g. Solves simultaneously* *A = 48 + B , 7A = 13B* *B = 56* *A = 48 + 56 (= 104)* *and* *uses 7C = 2B to find* *C = 2 × 56 ÷ 7 (= 16)* *leading to 56 + 104 + 16 oe* *176*	 *M1* *A1* *m1* *A1*	***Using simultaneous equations:*** *e.g. 7(48 + B) = 13B* *FT 'their 56, their 104 and their 16'* *FT 'their 56'*

#7

GCSE (9-1) Mathematics Component 1: Higher Tier	**Mark**	**Comment**
(b) $12\times\frac{3}{4}x+16\times x\,(=125)$ or equivalent, seen or implied $(x=)\,5$ or equivalent, seen or implied £3.75	 M2 A1 B1	 implied by 12 × 3.75 + 16 × 5 = 125 from trials or costs in the ratio 9 : 16 seen or implied M1 for (pack of sausages cost) $\frac{3}{4}x$ or equivalent or for sight of (packs of sausages =) 12 or for 'their 12' × 'their $\frac{3}{4}x$' + 16 × x = 125, provided 'their x' ≠ 1 CAO FT ¾ of 'their 5' or equivalent, provided 'their 5' is not an integer multiple of 4

#8

Component 1: Higher Tier	Mark	Comment
(b)(i) $\frac{7}{15}$	B1	
(b)(ii) 560 ÷ (5+3) × 7 OR 560 – 560 ÷ (5+3) 490 (g)	M2 A1	May be seen in stages M1 for sight of 560 ÷ (5 + 3) or 70 CAO

#9

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) $\frac{11}{21}$	B1	
(b) 5 parts = (£)45 OR 1 part = (£)9 OR 11 parts – 2x3 parts = 45 oe OR $^{11}/_{21} - 45 = {}^{6}/_{21}$ 45 ÷ 5 x 7 oe OR 9 x 7 (£)63	B1 M1 A1	May be implied by M1 FT an arithmetic error in 'their 11 – 2x3' for M1 A0
	(4)	

#10

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
$40 \div (1 + 3 + 4)$ or (egg, cheese, meat =) 5, 15, 20	M1	Allow for $8 \times 5 = 40$ but not for $40 \div 5 = 8$ 5, 15, 20 may be in a ratio or may be implied by e.g. tallying
$0.2 \times 5 + 0.1 \times 3 \times 5 + 0.25 \times 4 \times 5$ si $(= 1 + 1.5 + 5)$ oe	M2	FT $40 \div$ 'their $(1 + 3 + 4)$'; may be in stages; sight of 1, 1.5 and 5 followed by an answer of 7 or 8 implies M2 M1 for 2 terms out of 3 correct in the sum si or for (egg, cheese, meat =) 1, 1.5, 5
7.5 or $7\frac{1}{2}$	A1	CAO; Allow $\frac{15}{2}$; ignore rounding to e.g. 7 or 8 once correct answer seen; *an answer of 32.5 is a misinterpretation not a misread of the figures*
Alternative method		
$0.2 \times 40 \times 1 + 0.1 \times 40 \times 3 + 0.25 \times 40 \times 4$ *$(= 8 + 12 + 40 = 60)$ oe*	*M2*	*May be in stages;* *M1 for sight of 8, 12 and 40*
$\div (1 + 3 + 4)$	*M1*	*FT 'their 8 + 12 + 40' ;*
7.5 or $7\frac{1}{2}$	*A1*	*CAO; Allow $\frac{15}{2}$; ignore rounding to e.g. 7 or 8 once correct answer seen;* *final answer of e.g. $\frac{60}{8}$ is A0*
	(4)	

#11

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a)(i) Valid criticism of method e.g. 'He should have used the ratio 5 : 8' or 'He should have divided by 8 and multiplied by 5' or 'He has forgotten to subtract it from 36.'	E1	Do not accept e.g. 'Because the answer should be £22.50' or 'That is not 36 decreased by $\frac{3}{8}$.' Allow e.g. 'He has (only) found $\frac{3}{8}$' or '36 – 13.50 = 22.50, 13.50 is only the amount of the decrease.'
(a)(ii) Valid description of what £13.50 is e.g. 'He has found the amount of the reduction.' or 'He has found the amount decreased by $\frac{5}{8}$'	E1	Allow e.g.'He has found what $\frac{3}{8}$ is, he needs to subtract it,' (as implying the 'reduction') or 'How much he needs to take off.' or 'How much he saves each week.' or 'It is $\frac{3}{8}$'
(b) (a =) 135 (b =) 30 (c =) 35	B3	B1 for each correct value OR B1 for $a : b : c = 27 : 6 : 7$, oe si; and B1 FT for $\frac{200}{27+6+7} \times 27$ or $\frac{200}{27+6+7} \times 6$ or $\frac{200}{27+6+7} \times 7$; FT 'their $27 : 6 : 7$' OR B1 for $2a = 9b$ and $7b = 6c$ and finding e.g. $a = \frac{9}{2}b$ and $c = \frac{7}{6}b$ and B1 for solving e.g. $\frac{9}{2}b + b + \frac{7}{6}b = 200$ OR B1 for trials leading to 3 values in the ratio 27 : 6 : 7 and B1 for at least 2 further trials to attempt find 3 values in this ratio that sum to 200
	(5)	

#12

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) 4 parts = (£)6400 or $6400 \div 4$ or $5x - x =$ 6400 or equivalent	M1	Accept $\frac{4}{13}$ is 6400 or equivalent
(1 part = £) 1600	A1	
(Total cost = £) 1600×13 or (Total cost = £) 11200 + 8000 + 1600	m1	for 'their 1600' $\times$ 7 + 'their 1600' $\times$ 5 + 'their 1600' or for 'their 1600' $\times$ 13 or for sight of 9600 or 8000
= (£) 20800	A1	CAO If no marks, award SC2 for an answer of (£)16640 or SC1 for sight of $6400 \times 13 \div 5$ or equivalent
(b) (labour =) $7200 \times \frac{5}{3}$ (= 12000)	M1	Or equivalent full method.
(materials =) 6000×2.5 (= 15000)	M1	Or equivalent full method.
(professional fees =) $30800 - 7200 \times \frac{5}{3} - 6000 \times 2.5$ (= 30800 – 12000 – 15000)	M1	FT 'their $7200 \times \frac{5}{3}$ and 'their 6000×2.5' provided one is correct.
(professional fees =) 3800 (which is just over 3×1200)	A1	CAO
	(8)	

Ratio: Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	3	
#3	3	
#4	3	
#5	4	
#6	5	
#7	7	
#8	7	
Total	34	

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Marking Scheme

#1

Eduqas Autumn 2018 Component 2 Higher Tier	Marks	Comments
(a) 1 : 1 : 3 in any order	B1	Allow multiples of this ratio
(b) 3/5 or equivalent	B1 (2)	FT 'their 3' 'their 1 + 1 + 3'

#2

Component 2: Higher Tier	Mark	Comment
(a) 2 : 6 : 3	B2	Must be in the correct order. B1 for any correct but unsimplified ratio e.g.1 : 3 : 1.5, 2x : 6x : 3x, 10 ; 30 :15
(b) $\frac{3}{11}$ oe	B1	FT 'their 3' and 'their 11' providing the numerator and denominator in the final fraction are integers FT allowed from non-numeric answers to (a) e.g. 6x : 2x : x leading to $\frac{1}{9}$
	(3)	

#3

Component 2: Higher Tier	Mark	Comment
(a)(i) $\frac{5}{12}$	B1	ISW
(a)(ii) $\frac{18072}{12} \times 7$ (£)10542	M1 A1	FT 'their 2 + 3 + 7' from (a)(i) provided > 10

#4

Component 2: Higher Tier	Mark	Comment
(a) $\frac{2}{9}$ ISW	B1	
(b) 1400 ÷ 4 × 3 = 1050	M1 A1	May be seen in stages.
	(3)	

#5

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
(a) 7476 ÷ (10 + 8 + 3) × 2 = 712 OR (712 ÷ 2) × (10 + 8 + 3) = 7476 OR 7476 ÷ (10 + 8 + 3) × 10 – 7476 ÷ (10 + 8 + 3) × 8 = 712	B2	B1 for sight of 7476 ÷ (10 + 8 + 3) (=356) Not for 356 from 712 ÷ 2 OR 3560 OR 2848 OR 1068
(b) $\frac{5}{8}$ or 2 : 1 oe (5 : 3 AND) 6 : 3 OR 0.62(5) AND 0.66(…) or 0.67 OR 62(.5)% AND 66(…)% or 67% OR 15/24 AND 16/24 OR 1.6(…) : 1 or 1.7 : 1 AND 2 : 1 OR 1 : 0.6 AND 1 : 0.5 AND Third match unambiguously indicated	B1 B1	Allow for 5 × n ÷ 8 AND 2 × n ÷ 3 where n is any value Allow for the correct evaluation of both 'their 5 × n ÷ 8 AND 2 × n ÷ 3' AND Third match unambiguously indicated
	(4)	

#6

Eduqas Autumn 2018 Component 2 Higher Tier	Marks	Comments
(a) 4 × 95(p) + 5 × (£)1.04 + 7 × 75(p)	M1	Irrespective of place value (= £3.80 + £5.20 + £5.25 = £14.25)
× 28.8 ÷ (4+5+7)	m1	
(£)25.65	A1	If units are given they must be correct
		Alternative: *4 × 28.8 ÷ (4 + 5 + 7) or 5 × 28.8 ÷ (4 + 5 + 7) or 7 × 28.8 ÷ (4 + 5 + 7)* *M1* *95(p) × 7.2 + (£)1.04 ×9 + 75(p) × 12.6* *m1* *(FT from M1)* *(£)25.65* *A1*
(Profit =) ((£)29.99 – (£)25.65) × 12	m1	(=£4.34 × 12) FT use of 'their £25.65' provided at least M1 previously awarded
(£)52.08	A1	CAO, accept (£)52 from correct working

#7

Eduqas Summer 2018 C2 Higher Tier Update 130618	Mark	Comment
(a) Nickel ($\frac{1}{6}$ × 12 =) 2(%) Copper (100 – 12 - $\frac{1}{8}$12 =) 86(%) 43 : 6 : 1	B1 B1 B2	Accept sight of 0.02 or 2/100 FT 'their $\frac{1}{8}$12' Accept sight of 0.86 or 86/100 or equivalent B1 for 86 : 12 : 2 or equivalent, or B1 for 1 : 6 : 43 or in other incorrect order FT 'their $\frac{1}{8}$12' for B1 only unless equivalent stage(s) of simplification possible
(b)(65 + 14 + 9) × 27 ÷ 9 (=88 × 3) 264 (kg) Conclusion that it is not possible as 264 > 250, e.g. 'No as 264kg is greater than ¼ tonne'	M1 A1 E1 (7)	 FT provided M1 awarded for an appropriate conclusion Do not accept ¼ tonne as any amount other than correctly giving 250 kg, however it is not essential to state this conversion

#8

Eduqas Autumn 2019 C2 Higher Tier	Mark	Comment
(a)* Flour 70 × 102 ÷ 17 OR Sugar 10 × 102 ÷ 17 Flour 420 (g) Sugar 60 (g)	M1 A1 A1	 If answer reversed, allow A1 only
(b)* 2200 – 390 – 2×268 (= 1274) $\frac{1274}{2200}$ (× 100) or equivalent 57.91(%)	B1 M1 A2	 FT 'their 2200 – 390 – 2 × 268' CAO. A1 for 57.9(090...%) or 58(%) If no marks, award SC2 for an answer of 42.09(%)

Growth / Decay: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	4	
#4	6	
Total	16	

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Marking Scheme

#1

	Mark	Comment
Use of 80% (of original price) is 7680	S1	
Finds an appropriate percentage of the original price e.g.10% (of original price) is $\frac{7680}{8}$ or 1% (or original price) is $\frac{7680}{80}$ or attempts to find $\frac{7680}{0.8}$ oe	M1	An appropriate percentage is any factor of 100 Need not evaluate calculation but the calculation stated must be the correct one for the % claimed; may be in stages
9600	A1	CAO; implies S1 M1
	(3)	

#2

Component 1: Higher Tier	Mark	Comment
(a) $(45\,000) \times 1.02^8 \times 0.95^3$	B2	B1 for $\times 1.02^8$ OR $\times 0.95^3$
(b) B	B1	
	(3)	

#3

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
1.01×0.9	M1	
0.909 or equivalent	A1	
1–0.909 or 0.091 or equivalent	m1	FT 'their 0.909' or 'their 90.9(%)'
9.1%	A1	If M1 A… m0 then SC1 for a final answer of 'their 90.9%', FT 'their 0.909'
	(4)	

#4

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) 34.50 × 2 + (34.50 × 2) ÷ 4 oe si	M2	e.g. for 69 + 17.25 or $\frac{3450\times2\times1\frac{3}{12}}{100}$ or $\frac{3450\times2\frac{1}{2}}{100}$ oe M1 for 34.50 × 2 oe si or for 3450 × 1.02 – 3450 (= 3519 – 3450) or for sight of (£)69 or for sight of 2.5% oe
(£)86.25	A1	
(b) $\frac{65\times r\times5}{100}=9.75$ or $\frac{65\times r}{100}=\frac{9.75}{5}$ or 1.95 (per year interest) oe	M1	
(r =) $\frac{9.75\times100}{5\times65}$ oe	M1	e.g. $\frac{1.95}{65}\times100$ or sight of $\frac{3}{100}$
3 ISW	A1	Allow 3%
Alternative method 1: $\frac{65\times5}{100}$ $(=3.25)$ *oe*	*M1*	
9.75 ÷ 3.25 *3 ISW*	*M1* *A1*	*FT 'their 3.25'* *Allow 3%*
Alternative method 2: *9.75 ÷ 0.65 (=15) oe* *15 ÷ 5* *3 ISW*	*M1* *M1* *A1*	*May be found using a build-up method* *FT 'their 15'* *Allow 3%*
	(6)	

Growth / Decay: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	3	
#4	4	
#5	4	
#6	4	
#7	4	
#8	5	
#9	5	
#10	5	
#11	6	
#12	7	
#13	7	
Total	60	

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Marking Scheme

#1

Eduqas Autumn 2019 C2 Higher Tier	Mark	Comment
500×1.034^{25} = (£) 1153.41	M1 A2 (3)	Or equivalent full method Must be to the nearest penny A1 for (£) 1153.40(9...)

#2

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
(b) $8495 \times (1 - 0.16)^{11}$ (£)1248.06(0…) or (£)1248	M2 A1	May be seen in stages M1 for sight of 8495×0.84 (=7135.8) oe ISW Allow (£)1248.1(0)

#3

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
130×1.06^{10} (£)232.81	M2 A1	May be seen in stages. M1 for sight of 130×1.06 (= 137.8) CAO An answer of (£)208 (simple interest) from use of $130 \times 0.06 \times 10 + 130$ is awarded M1 A0
	(3)	

#4

Component 2: Higher Tier	Mark	Comment
$12\,250 \times (1 - 0{\cdot}18) \times (1 - 0.15)^8$ An answer in the range (£)2737.15 to (£)2737.20 (£)9512.80 to (£)9512.85 or (£)9513 *Allow answers not rounded or truncated*	M2 A1 B1	M1 for $12\,250 \times (1 - 0{\cdot}18)$ (= 10 045) OR $12\,250 \times (1 - 0{\cdot}15)^8$ (= 3338.0…) OR …..$\times (1 - 0{\cdot}18) \times (1 - 0{\cdot}15)^8$ Allow an answer of (£)2737 from correct working *(Year 8 value 3220.18 to 3220.20)* FT 'their car value' provided M2 awarded. Award M1 SC2 for an answer of (£)9923 or (£)9923.40 or (£)9923.41 OR M1 SC1 for an answer of (£)2326.59 from use of $12\,250 \times (1 - 0{\cdot}18) \times (1 - 0.15)^9$
	(4)	

#5

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
Sight of (1 – 0.38 =) 0.62 and (1– 0.16 =) 0.84 OR ((1– 0.38)(1– 0.16)=) 0.5208 oe	B1	
(6510 ÷ 0.84) oe	M1	FT 'their 1– 0.16' or 'their 1 – 0.38'; implied by sight of 7750 or 10 500
÷ 0.62 oe	M1	Division may be done in either order M2 for sight of 6510 ÷ 0.5208; FT 'their (1 – 0.38)(1 – 0.16)'
(£)12 500	A1	CAO If no marks award SC1 for an answer of (£)14 152(.17) from a reduction of 54%
	(4)	

#6

Component 2: Higher Tier	Mark	Comment
(1 – 0.198) × (1 – 0.065) oe, si	M1	0.802 × 0.935 Allow one error in subtractions.
0.749 87 oe, si	A1	CAO; allow 75% following full and correct working
(1 – 0.749 87) × 100 oe, si	M1	FT 'their derived 0.749 87' providing < 1 and ≠ 0.802 or 0.935; allow for sight of 1 – 0.749 87 or 0.25013
25.013 (%)	A1	FT (1 – 'their 0.749 87') × 100 Allow 25% following full and correct working
	(4)	

#7

Component 2: Higher Tier	Mark	Comment
$5000 \times 1.02^5 \times 1.013^4$ oe, si	M3	Method for M3 or M2 may be seen in stages M2 for use of ….× 1.02^5 or ..× 1.013^4 oe Note: $5000 \times 1.02^5 = 5520.40\ldots$ and $5000 \times 1.013^4 = 5265.11\ldots$ M1 for use of × 1.02 or ..× 1.013 oe Note: 5000 × 1.02 (= 5100) or 5000 × 1.013 (= 5065)
(£) 5813.11... or £5813.10 or (£)5813	A1	CAO A1 only from fully correct working.
	(4)	

#8

Eduqas Summer 2018 C2 Higher Tier Update 130618	Mark	Comment
(a) 500×1.021^{18} (= £)726.83	M2 A1	M1 for sight of 500×1.021 or equivalent CAO
(b) (£) $x \times (1 + y/100)^6$ or equivalent	B2 (5)	ISW B1 for sight of $x \times (1 + ...)^6$ or $(1 + y/100)^6$ or $x(y/100)^6$ B0 for $x \times 1.y^6$

#9

Component 2: Higher Tier	Mark	Comments
(a) Valid explanation e.g. 'When the second reduction is made, it is not 15% of the original amount, so the reduction is less than 35%.' or 'The reduction is 32% not 35%.' or 'It is 15% of 80% not 15% of 100%'	E1	
(b) 306 000 ÷ 0.85 oe, si ÷ 0.8(0) oe, si (£)450 000	 M1 M1 A2	Method marks can be awarded in either order Notes: M2 for ÷ 0.68 OR ÷ (0.8 × 0.85) M1 for ÷ 0.8 × 0.85 OR × 0.85 ÷ 0.8 unless the answer is (£)450 000 which is awarded M2 A2 A1 for sight of one of the following • 360 000 (from 306 000 ÷ 0.85) • 382 500 (from 306 000 ÷ 0.8) • 288 000 (from 306 000 ÷ 0.85 × 0.8) • 325 125 (from 306 000 ÷ 0.8 × 0.85) An answer of (£)450 000 which is awarded 4 marks unless incorrect working seen.
	(5)	

#10

Component 2: Higher Tier	Mark	Comment
10 000 ÷ 1250 (= 8)	M1	
35 950 × (1 – 0.18)^8	M2	FT for possible M2 for sight of one of: • 35 950 × (1 – 0.18)$^{\text{'their 10 000 ÷ 1250'}}$ • 35 950 × 0.82$^{\text{'their 10 000 ÷ 1250'}}$ May be seen in stages but the method must be seen and fully correct e.g. 8 stages with × 0.82 seen at each stage M1 for sight of 35 950 × (1 – 0.18) oe complete and correct method or sight of 29 479
7348.69 or 7348.68(...) or 7348.7 or 7349 or 7350	A1	CAO A1 only from fully correct working.
(35 950 – 7348.69 =)(£) 28 601.31	B1	If M1 M2 A1, accept answer in range 28 600 to 28 602; FT 'their 7348.69' provided M1 M2 awarded If M1 M2 A1 B0 awarded, then award further SC1 for an answer of 79(.5…)% or 80% decrease from $\left(\frac{35950 - 7348.69}{35950} \times 100 =\right)$
	(5)	

#11

	Mark	Comment
(a) 2500 × 0.84^n with any value of n from n=1 to n=10 or equivalent	M1	(2500 × 0.84 = £2100) (2500 × 0.84^2 = £1764) (2500 × 0.84^3 = £1481.76)
2500 × 0.84^n with a second value of n from n=1 to n=10 or n = 6 or equivalent leading to an answer closer to £1000 than the previous trial	m1	(2500 × 0.84^4 = £1244.6784) (2500 × 0.84^5 = £1045.529...) (2500 × 0.84^6 = £878.245...) (2500 × 0.84^7 = £737.725...) (2500 × 0.84^8 = £619.689...) (2500 × 0.84^9 = £520.539...) (2500 × 0.84^{10} = £437.253...)
6 (years)	A1	CAO If no working, award SC2 for an answer of 6 (years)
(b) 500 × (1 + 325/100)^3	M2	M1 for 500 × (1 + 325/100) (= £2125) or equivalent M1 implied by sight of a×500×3.25 + b×500 or a×1625 + b×500, or 5375, or 6375, where a≠0 and b≠0
(£) 38 382.81(25)	A1	Accept (£)38382 or 38383 If no marks, award SC1 for sight of (325/100)^3 or equivalent or sight of 17164.0625 (= 3.25^3×500)
	(6)	

#12

Component 2: Higher Tier	Mark	Comments
(a) 3000×1.04^5	M1	Or equivalent full and complete method
= (£)3649.95(87..) or (£)3649.96 or (£)3650	A1	
$\frac{3649.96-3000}{3000}(\times 100)$ oe AND $\frac{3\times190}{3000}(\times 100)$ oe OR $\frac{3649.96-3\times190}{3000}$ (x 100)	M2	FT 'their 3649.96' provided M1 previously awarded M1 for either $\frac{3649.96-3000}{3000}(\times 100)$ or $\frac{3\times190}{3000}(\times 100)$ provided M1 previously awarded
A indicated AND 2.7(%) or 2.66...(%)	A1	FT. Allow 2(%) or 2.6(%) or 3(%).
Valid assumption e.g. 'Account A interest rate stays the same' 'Account A interest rate **does not** vary' 'Account A interest rate **does not** go up or down'	E1	Do not allow 'Account A, interest rate can vary' 'Account A interest rate is not guaranteed'
Alternative method *$1.04^5 \times 100 - 100$ oe*	*M2*	*= 1.2166.... × 100 – 100* *M1 for 1.04^5*
21.7(%) or 21.66....(%)	*A1*	Allow 21(%) or 21.6(%) or 22(%)
(3 × 190) ÷ 3000 (× 100) (=19%)	*M1*	*FT providing M1 previously awarded*
A indicated AND 2.7(%) or 2.66...(%)	*A1*	*FT providing M1 M1 previously awarded* Allow 2(%) or 2.6(%) or 3(%)
Valid assumption e.g. *'Account A interest rate stays the same'* *'Account A interest rate **does not** vary'* *'Account A interest rate **does not** go up or down'*	*E1*	*Do not allow* *'Account A - interest rate can vary'* *'Account A interest rate is not guaranteed'*
(b) Valid impact based on assumption e.g. 'Even if the interest rate went up, the answer would still be account A but the difference would be more.' 'If the interest rate went down, account A may not have the greater increase.' 'If the interest rate doesn't stay the same, then Account A could have even more money than B or less than B'	E1	If no valid assumption is made then this mark cannot be awarded. E0E1 not allowed. Allow 'the answer could be different'. Do not allow 'the answer could be wrong'.
	(7)	

#13

Eduqas Autumn 2018 Component 2 Higher Tier	Marks	Comments
(a) 15000×1.034^{22} (= £) 31299(.91...)	M2 A1	M1 for indication of 15000×1.034 (= 15510) or equivalent Accept (£)31300
(b) 15000×1.034^{10} (= £ 20955.433...)	M1	
$15000 \times 1.034^{10} - 10000$ (= £ 10955.43...)	m1	
$10955(.43...) \times 1.034^{12}$ (= £16363.49...)	M1	FT 'their derived £10955.43...' FT from '£10955' gives (£)16362.846...
Total pay back 10000 + 16363 =) (£) 26363	A1	CAO, accept an answer that rounds to (£) 26363
	(7)	

Standard Form: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	2	
#3	3	
#4	3	
#5	3	
#6	3	
#7	3	
#8	4	
#9	4	
#10	5	
#11	5	
Total	37	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	Comment
$4(.0) \times 10^3$	B2	B1 for: • sight of 4000 • $\frac{9{\cdot}6 \times 10^8}{2{\cdot}4 \times 10^5}$ • $4(\cdot 0) \times 10^n$ where $n > 0$. • $a \times 10^3$ where $1 < a < 10$
	(2)	

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
$(3 \times 10^5 =)\ 300\,000$ or $(40\,000 =)\ 4 \times 10^4$	B1	
$\frac{3\times10^5}{4\times10^4}$ or $\frac{300\,000}{40\,000}$ = 7.5 (so more than 7)	B1	***Alternative method 1:*** *$7 \times 40000 = 280\,000$* *B1* *$(3 \times 10^5 =)\ 300\,000$ (so more than 7)* *B1* ***Alternative method 2:*** $\frac{7\times40000}{300000}$ *M1* $\frac{280000}{300000}$ *(which is less than 1)* *A1*
	(2)	

#3

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
$(3 \times 10^6) \div (2 \times 10^6)$ oe	M1	Allow for $(3 \times 10^6) \div (1.8 \times 10^6)$
1.5	A1	FT 'their estimate' If M0 then allow SC1 for sight of $(2.99 \times 10^6) \div (1.799 \times 10^6)$
km	B1	Appropriate unit for their answer e.g. 1500 m gets M1 A1 B1; allow for 'km' even if no calculation attempted
	(3)	

#4

Component 1: Higher Tier	Mark	Comment
(c)		
$2^5 \times 10^{3\times5}$	M1	Allow M1 for $1.9^5 \times 10^{3\times5}$
3.2×10^{16}	A2	A1 for 32×10^{15} or correctly converting 'their 32×10^{15}' to standard form, provided of equivalent difficulty If no marks, award SC1 for an answer of $3{\cdot}2 \times 10^9$ from $32 \times 10^{3+5}$

#5

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(c) $4^3 \times 10^{6\times3}$	M1	Allow dot for multiplication Allow for $4\,000\,000^3$
64×10^{18}	A1	implies M1; allow for 64 000 000 000 000 000 000
6.4×10^{19}	B1	FT 'their 64×10^{18}' converted to standard form, provided of equivalent difficulty

#6

Component 1: Higher Tier	Mark	Comment
(c) $\frac{9\times10^8}{3\times10^2}$ or $\frac{900\,000\,000}{300}$	M2	M1 for $\frac{9\times10^8}{300}$ or $\frac{9\times10^8}{298}$ or $\frac{8{\cdot}85\times10^8}{300}$ or $\frac{8{\cdot}9\times10^8}{298 \text{ or } 300}$ or $\frac{2\times10^8+7\times10^8}{3\times10^2}$ or $\frac{2\times10^8+7\times10^8}{300}$
3×10^6	A1	CAO An answer of 3 000 000 is awarded M2 A0

#7

Component 1: Higher Tier	Mark	
Sight of 70% and 5×10^8 OR 71% and 5×10^8 OR 70% and $5{\cdot}1 \times 10^8$	B1	Not for sight of 71% and $5{\cdot}1 \times 10^8$
$0{\cdot}7 \times 5 \times 10^8$ oe OR $0{\cdot}71 \times 5 \times 10^8$ oe OR $0{\cdot}7 \times 5{\cdot}1 \times 10^8$ oe	M1	Allow for $0{\cdot}71 \times 5{\cdot}1 \times 10^8$ If 5×10^8 or 5.1×10^8 is written in ordinary form, condone a slip by a power of 10 for M1. e.g. $0{\cdot}7 \times 50\,000\,000$
$3{\cdot}5 \times 10^8$ (km^2) ISW OR $3{\cdot}55 \times 10^8$ ISW OR $3{\cdot}57 \times 10^8$ ISW	A1	CAO Award B1 M1 A1 for an unsupported answer of $3{\cdot}5 \times 10^8$ (km^2).
	(3)	

#8

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) 4.3×10^{11}	B2	B1 for sight of the correct value not in standard form e.g. 0.43×10^{12} or 430 000 000 000
(b) 7.9×10^{5}	B2	Be aware of correct answer from incorrect work. Award B0. B1 for the correct value not in standard form e.g. 79×10^{4} or 790 000 If no marks, award SC1 for 760000 + 30000 seen with a slip in the addition but their answer correctly converted into standard form
	(4)	

#9

Component 1: Higher Tier	**Mark**	
$(2.16\times10^{7}) \div (3\times10^{3})$ or 21 600 000 ÷ 3000	M2	M1 for $(2.16\times10^{7}) \div 3000$ or an appropriate division with a place value error e.g. 216 000 000 ÷ 3000; implied by figs 72
7200 (people/km^2) or 7.2×10^{3}	A1	CAO; accept 0.72×10^{4} Do not ignore further incorrect working e.g. 7.2×10^{3} = 72 000 is A0
Y indicated and (8000 – 7200 =) 800 (people/km^2)	B1	FT 'their 7200' and the country that matches their values provided at least M1 previously awarded; answer must be given as an integer or correctly expressed in standard form.
	(4)	

#10

	Mark	**Comment**
(a) 2.4×10^{27}	B2	B1 for 24×10^{26} oe
(b) $\frac{5.4\times10^{11}}{6000}$	M1	si
$\frac{5.4\times10^{11}}{6\times10^{3}}$ or $\frac{540000000000}{6000}$	M1	oe, si
9×10^{7}	A1	CAO; accept trailing zeros e.g. 9.0×10^{7}; mark final answer Award M1 M1 A0 for answers of 0.9×10^{8} or 90 000 000
	(5)	

#11

Component 1: Higher Tier	Mark	Comment
(a) $600\,000 \div 20$ or $(6 \times 10^5) \div (2 \times 10)$	M1	
3×10^4	A1	Award M1 A0 for any one of the following: • $30\,000$ • 0.3×10^5
(b) $60 \times 3 \times 10^8$ oe	M1	e.g. $300\,000\,000 \times 60$
180×10^8 or 18 000 000 000 oe	A1	CAO
$1{\cdot}8(0) \times 10^{10}$ (litres per hour)	A1	FT 'their $60 \times 3 \times 10^8$', provided M1 awarded. If no marks, award SC1 for 5×10^6
	(5)	

Standard Form: Calculator

Question	Maximum Mark	Mark Awarded
#1	1	
#2	3	
#3	3	
Total	7	

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Marking Scheme

#1

Component 2: Higher Tier	Mark	Comment
The correct answer circled or clearly indicated $2{\cdot}4 \times 10^{-6}$	B1	
	(1)	

#2

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
$(3.30 \times 10^{23}) \div (6.08 \times 10^{19})$	M1	
5430 or 5.43×10^3	A2	A1 for 5427·(6…) or 5428 or equivalent
	(3)	

#3

Eduqas Summer 2018 C2 Higher Tier Update 130618	Mark	Comment
7.7×10^7 **AND** 2.2×10^8	B3 (3)	B2 for sight of either 7.7×10^7 OR 2.2×10^8, or for sight of 77 000 000 AND 220 000 000, or for sight of $7.704(4) \times 10^7$ AND $2.21(408) \times 10^8$ B1 for sight of $0.515 \times 1.496 \times 10^8$ $(= 7.7044 \times 10^7)$ OR $1.48 \times 1.496 \times 10^8$ $(= 2.21408 \times 10^8)$

Upper and Lower Bounds: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	2	
#2	4	
#3	5	
#4	6	
Total	17	

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Marking Scheme

#1

Component 1: Higher Tier	Mark	Comment
100(g) ≤ mass difference ≤ 300(g)	B2	Not from incorrect working B1 for one end correct in the inequality or for sight of both values
	(2)	

#2

Component 1: Higher Tier	Mark	Comment
(a) 1 ≤ time difference ≤ 3	B2	Not from wrong working B1 for one end correct in the inequality or for sight of both values
(b)		Accept a statement such as 'The van is always less than 6 m long/the maximum length acceptable' stated once only; may be written anywhere. If lengths are given, they must be within the appropriate limits.
Valid example for may be correct e.g. Van 590 cm AND trailer 198 cm	E1	For the van accept any statement such as 'The van is always less than 6 m long/the maximum length acceptable' or any values satisfying: 585 cm ≤ length of the van < 595 cm AND 195 cm ≤ length of the trailer ≤ 200 cm Allow e.g. 'The trailer could be less than 200 (cm).' Example might use the values given in the question (590 cm and 200 cm) and not consider the values are rounded to the nearest 10 cm.
Valid example for may not be correct e.g. (Van 590 cm and) trailer 201 cm	E1	(For the van accept any statement such as 'The van is always less than 6 m long' or any values satisfying: 585 cm ≤ length of the van < 595 cm AND) 200 cm < length of the trailer < 205 cm Allow e.g. 'The trailer could be more than 200 (cm)/the maximum length acceptable' or 'the length of the trailer could be 205 (cm)'.
	(4)	

#3

	Mark	Comment
(a) 50 inches = 127 cm	B2	B1 for e.g. 50.8 + 50.8 + 25.4
Might possibly be safe and use of the limit of accuracy e.g. 'she could be only 126.9 cm tall' or 'Her height could be anywhere between 126.5 and 127.5.'	B1	NB bounds are not required, though could be used. Candidates must indicate they have interpreted the given limit of accuracy correctly in some way. Must not contain contradictions or errors.
(b)(i) Valid assumption eg 'Jenna has not grown since she was last measured' or 'Jenna is **still** 127 cm' or Jenna has not had a growth spurt.' or 'Jenna is wearing the same shoes that she was when she was measured.'	E1	Any valid assumption that indicates that Jenna may no longer be the same height Not for comments assuming her height is 127 or a rounded version of this, as this is given information
(b)(ii) Valid impact based on their assumption and decision in part *(a)* e.g. 'Jenna may now be definitely tall enough to ride.'	E1	Comments such as 'My answer would be different' are not acceptable
	(5)	

#4

	Mark	Comment
Use of 225(g) and 7.5(g)	B1	
225 ÷ 7.5 si	M1	FT provided 220 < 'their 225' $\leq$ 225 and 7.5 $\leq$ 'their 7.5' < 8; may be implied by build up method finding e.g. 225g makes 360 biscuits
Any non-calculator method for division of 225 ÷ 7.5 seen	M1	e.g. $\frac{2250}{75}$ or 90 ÷ 3 or build up method using 15
30 (batches of biscuits)	A1	CAO; si; implied by 360 biscuits
30 × 12 ÷ 3 × 2 oe	M1	FT 'their 30' provided it has been derived using both bounds (which need to be in the ranges above); allow rounded or truncated if following through
(£) 240	A1	FT ; use of 220 and 8 scores 0
	(6)	

Upper and Lower Bounds: Calculator

Question	Maximum Mark	Mark Awarded
#1	3	
#2	3	
#3	4	
#4	4	
#5	4	
#6	4	
#7	5	
Total	27	

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Marking Scheme

#1

Eduqas Summer 2018 C2 Higher Tier Update 130618	Mark	Comment
Sight of 715 (g) and 305 (g) 715 + 4 × 305 1935 (g)	B1 M1 A1 (3)	 FT 'their 715' and 'their 305' in working provided <720 and <310 respectively CAO, not FT

#2

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
3050 ÷ 715 = 4.26(5….) or 4.266 or 4.27(m/s)	M2 A1	Answer line takes precedence. Allow 3049.999.. for 3050, must clearly be a recurring 9. M1 for 'their 3050' ÷ 'their 715' provided 3000 < 'their 3050' ≤ 3100 AND 710 ≤ 'their 715' < 720. CAO from M2 only Accept 4.3 from correct working Note: No marks for unsupported answers
	(3)	

#3

Eduqas Autumn 2019 C2 Higher Tier	Mark	Comment
(c) Sight of 97.5 (g) 30 × 97.5 (÷1000) 2.925 (kg)	B1 M1 A2	 FT 'their 97.5' provided 95 ≤ 'their 97.5' < 100 A1 for 2925 (g)

#4

Eduqas Autumn 2018 Component 2 Higher Tier	Marks	Comments
Sight of least density 7747.5 (kg/m^3)	B1	
Sight of all least dimensions 0.325(m), 0.215(m) and 0.105(m)	B1	Accept equivalents in cm
Mass 7747.5 × 0.325 × 0.215 × 0.105	M1	FT provided 'their density' < 7748, and at least 1 of the least dimensions is correct Must be in the correct units, if cm used throughout need sight of appropriate conversion of each to m, or volume to m^3
56.8(kg)	A1	CAO, from correct working and not from premature approximation
	(4)	

#5

Component 2: Higher Tier	Mark	Comment
Use of 8.5 AND 13	B1	
$\frac{13}{175}(\times 100) - \frac{8.5}{170}(\times 100)$ (= 7.4285..% − 5%)	M2	Award M2 for $\frac{170 - 8.5}{170}(\times 100) - \frac{175 - 13}{175}(\times 100)$ (= 95 − 92.57..)(%) M1 for either $\frac{8.5}{170}(\times 100)$ OR $\frac{13}{175}(\times 100)$ provided unambiguous or used to obtain the final answer May be seen as 170 × 0.05 = 8.5 If B0, FT for M2 or M1 provided unambiguous or used to obtain the final answer provided: for M2: 8 ≤ their 8.5'< 9 AND 12 < 'their 13' ≤ 14. for M1: 8 ≤ their 8.5'< 9 OR 12 < 'their 13' ≤ 14. Award M1 for $\frac{170 - a}{170}(\times 100) - \frac{175 - b}{175}(\times 100)$ provided 8 ≤ a < 9 OR 12 < b ≤ 14
= 2.4(2…) or $2\frac{3}{7}$ (%) oe	A1	CAO Allow 2(%) from correct working. If no marks, award SC1 for an answer of 0.697(5..)% or 0.7% from: $\frac{11}{175}(\times 100) - \frac{9.5}{170}(\times 100)$ (=6.286...%. − 5.588…%)
	(4)	

#6

Component 2: Higher Tier	Mark	Comment
Sight of 38.5 (cm) AND 44.5 (mm)	B1	May be in a list of all the bounds and may be seen as 385 mm and 4.45 cm Note: 44.5 mm × 7 = 311.5 mm or 31.15 cm
38.5 – 7 × 4.45 or 385 – 7 × 44.5	M2	If B0, FT provided unambiguously chosen: Allow M2 for either of the following: • use of 38 < 'their 38.5' ≤ 39 AND 4.4 ≤ 'their 4.45' < 4.5 • use of 380 < 'their 385' ≤ 390 AND 44 ≤ 'their 44.5' < 45 Allow M1 for calculations with the bounds for M2 but with mixed units e.g. 38.5 – 7 × 44
= 7.35 (cm) or 73.5 (mm)	A1	CAO. If units are given, they must be correct.
	(4)	

#7

Component 2: Higher Tier	Mark	Comments
(a) (1 078 500 + 249 350 =) 1 327 850 (km^2)	B2	B1 for 1327300 < answer < 1328400
(b) 81 500 000 $\frac{81\,500\,000 \leq \text{min pop} < 82\,000\,000}{1\,327\,850}$ 61(.377...) (people/km^2) ISW	B1 M1 A1	 FT their (a) FT only for 81 500 000 ÷ their (a)
	(5)	

Surds: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	1	
#2	1	
#3	2	
#4	2	
#5	2	
#6	4	
#7	4	
#8	5	
#9	5	
#10	6	
#11	7	
#12	8	
#13	8	
#14	8	
#15	9	
Total	72	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
(a) $8\sqrt{7}$	B1	Accept $8\sqrt[2]{7}$ or $8 \times \sqrt{7}$

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	**Mark**	**Comment**
(b)(i) 8	B1	–8 is B0

#3

Component 1: Higher Tier	**Mark**	**Comment**
(a) $21\sqrt{2}$	B1	
(b) $\sqrt{11}$	B1	
	(2)	

#4

GCSE (9-1) Mathematics Component 1: Higher Tier	**Mark**	**Comment**
(d) $7\sqrt{6}$	B2	B1 for $\frac{42}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}}$ oe seen

#5

Component 1: Higher Tier	**Mark**	**Comment**
(b) $\frac{6}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$	M1	
$3\sqrt{2}$	A1	

#6

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
$10-3\sqrt{5}=\frac{1}{2}\times base\times\sqrt{5}$	B1	Any clear notation is acceptable.
$(base=)\frac{10-3\sqrt{5}}{\frac{1}{2}\times\sqrt{5}}$ or equivalent	B1	Allow $\frac{10-3\sqrt{5}}{\sqrt{5}}=\frac{1}{2}\times base$ or $10\sqrt{5}-3\times5=\frac{1}{2}\times base\times5$ or $20=\sqrt{5}(base+6)$
$(base=)\frac{20}{\sqrt{5}}-6$ or better or $(base=)\frac{2\times10\sqrt{5}-2\sqrt{5}\times3\sqrt{5}}{\left(\sqrt{5}\right)^2}$ or better	M1	Allow $\frac{10}{\sqrt{5}}-3=\frac{1}{2}\times base$ or better or $\frac{10\sqrt{5}-3\sqrt{5}\times\sqrt{5}}{\left(\sqrt{5}\right)^2}=\frac{1}{2}\times base$ or better
$(base=)4\sqrt{5}-6$	A1	Allow $-6+4\sqrt{5}$
	(4)	

#7

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(Total of the 3 values =) $18\sqrt{3}$	B1	May be seen in later working
$(\frac{12}{\sqrt{3}}=)\ 4\sqrt{3}$	B1	
$(\sqrt{3}^5=)\quad 9\sqrt{3}$	B1	
(x = $18\sqrt{3}-4\sqrt{3}-9\sqrt{3}$ =) 5 $\sqrt{3}$	B1	FT provided at least B2 previously awarded, the third value of the form $a\sqrt{3}$ and x > 0 Mark the final answer unless x clearly identified
Alternative method 1 (multiplying by $\sqrt{3}$) *(Total of the 3 values =) $18\sqrt{3}$*	*B1*	*May be seen in later working*
$\sqrt{3}x + 12 + \sqrt{3}^6 = 54$	*B1*	*FT their $a\sqrt{3}$* *Using $(x+\frac{12}{\sqrt{3}}+\sqrt{3}^5=18\sqrt{3})\times\sqrt{3}$*
$\sqrt{3}^6 = 27$	*B1*	
$x = \left(\frac{54-12-27}{\sqrt{3}}=\right)\ 5\sqrt{3}$	*B1*	*FT provided at least B1 B1 previously awarded, $\sqrt{3}^6$ is an integer and x > 0* *Mark the final answer unless x clearly identified*
Alternative method 2 (multiplying by $\sqrt{3}$) *(Total of the 3 values =) $18\sqrt{3}$*	*B1*	*May be seen in later working*
$(\sqrt{3}^5=)\quad 9\sqrt{3}$	*B1*	
$\sqrt{3}x + 12 + 27 = 54$ *or better*	*B1*	*FT their $a\sqrt{3}$* *Using $(x+\frac{12}{\sqrt{3}}+9\sqrt{3}=18\sqrt{3})\times\sqrt{3}$*
$x = \left(\frac{54-12-27}{\sqrt{3}}=\right)\ 5\sqrt{3}$	*B1*	*FT their $a\sqrt{3}$ provided at least B1 B1 previously awarded and x > 0* *Mark the final answer unless x clearly identified*
	(4)	

#8

Component 1: Higher Tier	Mark	Comment
Sight of $\sqrt{27}=3\sqrt{3}$	B1	
$\frac{44}{5+\sqrt{3}}\times\frac{5-\sqrt{3}}{5-\sqrt{3}}$ oe	M1	
$44\times\frac{5-\sqrt{3}}{22}$ oe	B1	For a correct denominator of 22
$7-3\sqrt{3}+10-2\sqrt{3}$ oe	M1	FT for final M1 A0 provided B1 M1 previously awarded
$17-5\sqrt{3}$	A1	CAO
Alternative method		
Sight of $\sqrt{27}=3\sqrt{3}$	*B1*	*May be seen at any stage*
$\frac{(7-\sqrt{27})(5+\sqrt{3})+44}{5+\sqrt{3}}\left(=\frac{35+7\sqrt{3}-5\sqrt{27}-\sqrt{27\times3}}{5+\sqrt{3}}\right)$ oe	*M1*	
$\left(=\frac{70-8\sqrt{3}}{5+\sqrt{3}}\right)$oe si		
$=\frac{(70-8\sqrt{3})(5-\sqrt{3})}{(5+\sqrt{3})(5-\sqrt{3})}$ oe si	*M1*	*FT 'their'$\frac{70-8\sqrt{3}}{5+\sqrt{3}}$, provided B1 M1 previously awarded*
$=\frac{(350-70\sqrt{3}-40\sqrt{3}+24)}{22}$ oe si	*B1*	*For a correct denominator of 22*
$=17-5\sqrt{3}$	*A1*	*CAO*
	(5)	

#9

Component 1: Higher Tier	Mark	
$\left(8\sqrt{5}-2-2(\sqrt{5}+3)\right)\div2$ OR $4\sqrt{5}-1-(\sqrt{5}+3)$	M2	Condone missing brackets if A1 is awarded. M1 for either: • $8\sqrt{5}-2-2(\sqrt{5}+3)$ (= $6\sqrt{5}-8$) • $2(\sqrt{5}+3)+2x = 8\sqrt{5}-2$
$3\sqrt{5}-4$	A1	CAO
$(3\sqrt{5}-4)(\sqrt{5}+3)=15+9\sqrt{5}-4\sqrt{5}-12$	M1	FT 'their $a\sqrt{5}\ \pm b$' providing $a \neq 0$ and $b \neq 0$.
$5\sqrt{5}+3$ (cm^2)	A1	Mark final answer. FT
	(5)	

#10

GCSE (9-1) Mathematics Component 1: Higher Tier	**Mark**	**Comment**
(a) $\sqrt{3}$	B1	
(b) $8\sqrt{7}$	B2	Allow $k = 8$; B1 for $3\sqrt{7}$ or $5\sqrt{7}$ seen
(c) –2	B2	B1 for 3 out of 4 correct in $8+4\sqrt{5}-4\sqrt{5}-2(5)$ or for sight of all 4 terms e.g. listed
(d) $(x-\sqrt{3})(x+\sqrt{3})$	B1	seen or implied
	(6)	

#11

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) $7\sqrt{11}$	B2	Allow $k = 7$; B1 for $2\sqrt{11}$ or $5\sqrt{11}$ seen
(b) $\frac{3-\sqrt{3}-\sqrt{3}+1}{\sqrt{3}}$ or better	M1	M marks may be awarded in reverse order For squaring the numerator with at least 3 terms out of 4 correct; may be implied by e.g. $\frac{3-2\sqrt{3}-1}{\sqrt{3}}$
$\frac{3-\sqrt{3}-\sqrt{3}+1}{\sqrt{3}}\times\frac{\sqrt{3}}{\sqrt{3}}$ or $\frac{4}{\sqrt{3}}-2$	M1	For rationalising the denominator or writing as a simplified binomial
$\frac{4}{3}\sqrt{3}-2$	A1	For correct completion to given form
Alternative method: $\frac{3-\sqrt{3}-\sqrt{3}+1}{\sqrt{3}}$ $(=c\sqrt{3}+d)$	*M1*	
$4-2\sqrt{3}=3c+d\sqrt{3}$ *and e.g. compares appropriate terms*	*M1*	
$c=\frac{4}{3}$ $d=-2$	*A1*	
(c) Any values such that x and y are not square and $y = 4x$	B2	B1 for values x and y such that $y = 4x$ oe, si
	(7)	

#12

	Mark	Comment
(a) $3+11\sqrt{3}$	B3	B2 for $k+11\sqrt{3}$ or for any two correct terms in $3+7\sqrt{3}+4\sqrt{3}$ or B1 for $\frac{\sqrt{7}\sqrt{9}}{\sqrt{7}}$ oe si or $7\sqrt{3}$ or $4\sqrt{3}$ seen
(b) $\frac{1}{2}\times(7-2\sqrt{2}+5+\sqrt{2})\times h=6\sqrt{2}-1$ or $\frac{1}{2}\times h\times(3\sqrt{2}-2)+(7-2\sqrt{2})\times h=6\sqrt{2}-1$	B1	
$(h=)\frac{2(6\sqrt{2}-1)}{12-\sqrt{2}}$ or $(h=)\frac{12\sqrt{2}-2}{12-\sqrt{2}}$	M1	FT 'their$(\frac{12-\sqrt{2}}{2})'h=6\sqrt{2}-1$; 'their$(\frac{12-\sqrt{2}}{2})$' must be of the form $a+b\sqrt{2}$ where a and b are non-zero; solves for h; allow for ½h
$(h=)\frac{2(6\sqrt{2}-1)}{12-\sqrt{2}}\times\frac{12+\sqrt{2}}{12+\sqrt{2}}$ or $(h=)\frac{12\sqrt{2}-2}{12-\sqrt{2}}\times\frac{12+\sqrt{2}}{12+\sqrt{2}}$	M1	FT $\frac{2(6\sqrt{2}-1)}{\text{'their}(12-\sqrt{2})\text{'}}$; rationalises their expression for h or ½h
$h=\frac{2(72\sqrt{2}+12-12-\sqrt{2})}{144-2}$ or better	M1	FT $\frac{2(6\sqrt{2}-1)}{\text{'their}(12-\sqrt{2})\text{'}}\times\frac{\text{'their}(12+\sqrt{2})\text{'}}{\text{'their}(12+\sqrt{2})\text{'}}$ multiplies out their expression for h or ½h
$(h=)\sqrt{2}$	A1	CAO
Alternative method: $\frac{1}{2}\times(7-2\sqrt{2}+5+\sqrt{2})\times h=6\sqrt{2}-1$ or $\frac{1}{2}\times h\times(3\sqrt{2}-2)+(7-2\sqrt{2})\times h=6\sqrt{2}-1$	*M1*	
$(h=)\frac{2(6\sqrt{2}-1)}{12-\sqrt{2}}=\frac{12\sqrt{2}-2}{12-\sqrt{2}}$	*M1*	
Factorises: $\frac{\sqrt{2}(12-\sqrt{2})}{12-\sqrt{2}}$	*M2*	
$(h=)\sqrt{2}$	*A1*	
	(8)	

#13

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
(a) $11\sqrt{5}$	B2	B1 for sight of $7\sqrt{5}$ or $4\sqrt{5}$
(b)(i) $\sqrt{2} : 5+\sqrt{2}$	B1	
(b)(ii) $(17\times)\dfrac{\sqrt{2}}{5+2\sqrt{2}}\times\dfrac{5-2\sqrt{2}}{5-2\sqrt{2}}$ $(17\times)\dfrac{5\times\sqrt{2}-2(\sqrt{2})^2}{25-10\sqrt{2}+10\sqrt{2}-(2\sqrt{2})^2}$ si $(17\times)\dfrac{5\times\sqrt{2}-4}{25-8}$ oe, si $5\sqrt{2}-4$	M1 m1 A2 A1	A1 for either the numerator or denominator correct Accept $b = 5$, $c = -4$
	(8)	

#14

Component 1: Higher Tier	**Mark**	
(a) $35\times 3 - 28\sqrt{3} + 3\sqrt{3}$ or better	M2	with at most one sign or arithmetic slip M1 for any one of 105, $-28\sqrt{3}$, $3\sqrt{3}$ si
$105 - 25\sqrt{3}$	A1	Allow e.g. $-25\sqrt{3} + 105$;
(b) $2(6-\sqrt{2})+x\times 5\sqrt{2}$ $(=33\sqrt{2}-18)$ si	B1	or $2(6-\sqrt{2}-x)+x(5\sqrt{2}+2)$ $(=33\sqrt{2}-18)$ si omitted brackets may be recovered in later work
Forms a correct equation for the area **and** either isolates x term: $5x\sqrt{2}=33\sqrt{2}-18-12+2\sqrt{2}$ or collects terms: $30+5x\sqrt{2}=35\sqrt{2}$	M1	FT 'their $2(6-\sqrt{2})+x\times 5\sqrt{2}$' $=33\sqrt{2}-18$ oe providing expression is dimensionally correct for an area and at most one error in the expression; allow one further error in forming and rearranging the equation e.g. sign, bracketing or arithmetic slip correct equation implies the B1
$(x=)\ \dfrac{35\sqrt{2}-30}{5\sqrt{2}}$ or $(x=)\ 7-\dfrac{6}{\sqrt{2}}$	A1	FT;
$(x=)\ \dfrac{35\sqrt{2}-30}{5\sqrt{2}}\times\dfrac{5\sqrt{2}}{5\sqrt{2}}$ or $(x=)$ $7-\dfrac{6}{\sqrt{2}}\times\dfrac{\sqrt{2}}{\sqrt{2}}$ oe	M1	FT 'their expression with irrational denominator' providing 1 mark previously awarded
$(x=)\ 7-3\sqrt{2}$	A1	CAO; Mark final answer
	(8)	

#15

Component 1: Higher Tier	Mark	Comment
(a)		
$\frac{35}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$	M1	
$7\sqrt{5}$	A1	
$6\sqrt{5}$	A1	FT 'their k$\sqrt{5}$'
Alternative method:		
$\left(\frac{35}{\sqrt{5}} - \frac{5}{\sqrt{5}} = \right) \quad \frac{30}{\sqrt{5}}$	*B1*	
$\frac{30}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$	*M1*	*FT 'their* $\frac{30}{\sqrt{5}}$
$6\sqrt{5}$	*A1*	
(b)		
$20 - 5a\sqrt{3} + 8\sqrt{3} - 6a$	M2	M1 for 3 terms correct
$20 - 6a + 40 = 18$	m1	FT provided M1 awarded
$a = 7$	A1	FT
$-5a + 8 + b = 0$	m1	FT
$b = 27$	A1	FT
	(9)	

Product Rule for Counting: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	4	
#3	4	
#4	4	
#5	4	
#6	5	
#7	5	
Total	30	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) 720	B2	B1 for $6 \times 5 \times 4 \times 3 \times 2\ (\times 1)$ or 6! or equivalent
(b) 240	B2	FT $\frac{\text{'their 720'}}{3}$ B1 for $2 \times 5 \times 4 \times 3 \times 2\ (\times 1)$ or $(6 \times 5 \times 4 \times 3 \times 2\ (\times 1)) \div 3$ or $\frac{6!}{3}$ or 120 + 120 or $\frac{2}{6} \times$ 'their 720' or equivalent
	(4)	

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) 5040	B2	B1 for 7! or $7 \times 6 \times 5 \times 4 \times 3 \times 2\ (\times 1)$ or equivalent
(b) 210	B2	FT 'their 5040' $\div (4 \times 3 \times 2\ (\times 1))$ B1 for $7 \times 6 \times 5$ or $\frac{7!}{4!}$
	(4)	

#3

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) 243	B2	B1 for 3^5 oe
(b) $\frac{2}{3}$ oe	B2	B1 for $p \times$ 'their m' $= 2 \times 3^4$ oe or for sight of $\frac{3^4 \times 2}{3^5}$ or $\frac{3^5 \times 2}{3}$ oe
	(4)	

#4

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) 720	B2	B1 for $10 \times 9 \times 8$ oe
(b) 144	B2	B1 for $9 \times 2 \times 8$ oe or 'their 720' $\div 5$ oe
	(4)	

#5

Component 1: Higher Tier	Mark	Comment
(a) $5 \times 4 \times 3$ 60	M1 A1	
(b) $4 \times 1 \times 3 \times 2$ or $2 \times 60 \div 5$ 24	M1 A1	May be seen in stages FT 'their 60' Allow 2/5 of 60.
	(4)	

#6

	Mark	Comment
(a) 2520	B2	B1 for $7 \times 6 \times 5 \times 4 \times 3$ oe
(b) 60 or $\frac{5\times4\times3}{7\times6\times5\times4\times3}$ or $\frac{1}{7}\times\frac{1}{6}$ $\frac{60}{2520}$ oe; ISW;	B2 B1	B1 for $(1\times)\ 5 \times 4 \times 3\ (\times1)$ oe seen FT $\frac{\text{'their derived 60'}}{\text{'their derived (a)'}}$ NB an answer of $\frac{120}{5040}$ following an answer of 5040 in (a) earns B0 B1FT here, so not from wrong working
	(5)	

#7

Component 1: Higher Tier	Mark	Comment
(a) 125	B2	B1 for sight of 5^3 oe
(b) 60 $\frac{60}{125}$ oe ISW	B2 B1	B1 for sight of $5 \times 4 \times 3$ but not $5 \times 4 \times 3 \times 2\ (\times 1)$ FT 'their derived 125' provided it is not 100, and 'their $5 \times 4 \times 3$' provided fraction < 1
	(5)	

Product Rule for Counting: Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	4	
#3	5	
#4	5	
Total	18	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
(a) 40 320	B2	B1 for sight of 8! or equivalent product
(b) 10 080	B2	B1 for sight of $4 \times 7 \times 6 \times 5 \times 4 \times 3$ or equivalent
	(4)	

#2

Component 2: Higher Tier	**Mark**	**Comment**
2×3×2×3×2×1 AND 6×5×4×3×2×1	M3	M2 for 2×3×2×3×2×1 (= 72) or M1 for 6×5×4×3×2×1 or 6! (= 720)
(6×5×4×3×2×1 − 2×3×2×3×2×1) = 648 (more combinations)	A1	
	(4)	

#3

Component 2: Higher Tier	Mark	Comments
(a) 5040	B2	B1 for 7×6×5×4×3×2(×1) or 7!
(b) 720	B2	B1 for 6×5×4×3×2(×1×1) or 6! or 'their 5040' ÷ 7
(c) $\frac{4320}{5040}$ or $\frac{6}{7}$ oe; ISW	B1	FT $\frac{'their\ derived\ 5040 - 720'}{'their\ derived\ 5040'}$
	(5)	

#4

Component 2: Higher Tier	**Mark**	**Comment**
(a) 40320	B2	B1 for $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2\ (\times 1)$ or 8!
(b) 720 or $\frac{1}{8} \times \frac{1}{7}$	B2	B1 for $(1 \times 1 \times) 6 \times 5 \times 4 \times 3 \times 2\ (\times 1)$ or 6! B1 for sight of $\frac{1}{8}$ and $\frac{1}{7}$ oe only
$\frac{720}{40320}$ or $\frac{1}{56}$ oe	B1	ISW FT '$\frac{\text{their derived } 720}{\text{their derived } 40320}$' providing at least B1 previously awarded in both (a) and (b).
	(5)	

Direct / Inverse Proportion: Non-Calculator

Question	Maximum Mark	Mark Awarded
#1	1	
#2	5	
#3	5	
#4	6	
#5	6	
#6	6	
Total	29	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
Bottom left (5th) graph ticked	B1	
	(1)	

#2

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) $P \propto \frac{1}{A}$ or $P = \frac{k}{A}$ or equivalent	B1	seen or implied; if variables seen, must be P and A but allow any other letter for k; may be implied by e.g. $x \div 0.08 = 30$
$(k =)\ 0.08 \times 30$	M1	
$P = \frac{2.4}{A}$ or $P = \frac{12}{5A}$ or equivalent	A1	CAO
(b) $(A =)\frac{2.4}{80}$ or equivalent	M1	FT 'their 2.4' , provided k is not an integer.
$(A =)0.03\ (m^2)$ or equivalent ISW	A1	FT
	(5)	

#3

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
$I \propto \frac{1}{d^2}$ or $I = k \times \frac{1}{d^2}$ or equivalent	B1	
$7 = \frac{k}{2^2}$	M1	FT their equation providing it is non-linear
$k = 28$ or $I = \frac{28}{d^2}$	A1	FT their equation providing it is non-linear
$(I =)\frac{28}{4^2}$	M1	FT 'their 28'
$(I =)1.75$ (candela) CAO	A1	***Alternative method:*** *7×2^2 seen or implied in later working* B1 *Forms $7 \times 2^2 = I \times 4^2$* M2 *or M1 if one error* *$I = \frac{7 \times 4}{16}$ seen or implied; FT 'their equation of equivalent difficulty'* M1 *$(I =)1.75$ (candela) CAO* A1
	(5)	

#4

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	Comment
(a) $y \propto \frac{1}{\sqrt[3]{x}}$ OR $y = \frac{k}{\sqrt[3]{x}}$ oe	B1	Allow $y \propto \frac{k}{\sqrt[3]{x}}$;
$2 = \frac{k}{\sqrt[3]{27}}$ OR $2 = \frac{k}{3}$ OR $k = 6$	M1	M1 implies B1 FT (for possible B0 M1 A0) for use of $y \propto x^{\frac{1}{3}}$ or $y \propto \frac{1}{x^n}$ with $n > 0$ and $n \neq \frac{1}{3}$
$y = \frac{6}{\sqrt[3]{x}}$	A1	CAO; may be seen (explicitly) in part (b)
(b)(i) (y =) 0.6 oe	B1	FT 'their derived k' or use of $y \propto x^{\frac{1}{3}}$ or $y \propto \frac{1}{x^n}$ with $n > 0$ and $n \neq \frac{1}{3}$
(b)(ii) $\sqrt[3]{x} = \frac{6}{3}$ oe	M1	FT 'their derived k' or use of $y \propto x^{\frac{1}{3}}$ or $y \propto \frac{1}{x^n}$ with $n > 0$ and $n \neq \frac{1}{3}$
(x =) 8	A1	FT
	(6)	

#5

Component 1: Higher Tier	Mark	
(a) $y \propto \frac{1}{x^2}$ or $y = \frac{k}{x^2}$ oe, si	B1	Allow $y \propto \frac{k}{x^2}$
$3 = \frac{k}{4^2}$ or $k = 3 \times 4^2$ or k = 48	M1	FT from $y \propto x^2$ or $y \propto \frac{1}{x^n}$ with n > 0 and $n \neq 2$. M1 implies B1 (excluding FT case).
$y = \frac{48}{x^2}$	A1	Correct answer implies all 3 marks. Allow for $y = \frac{k}{x^2}$ AND k = 48 seen.
(b)(i) $\frac{48}{64}$ oe, ISW	B1	FT 'their (a) provided M1 previously awarded.
(b)(ii) $\sqrt{\frac{48}{1200}}$ or $\sqrt{\frac{1}{25}}$ oe	M1	FT 'their (a) provided M1 previously awarded.
$\frac{1}{5}$ oe	A1	CAO
	(6)	

#6

GCSE (9-1) Mathematics Component 1: Higher Tier	Mark	
(a) $V \propto \frac{1}{P}$ or $P \propto \frac{1}{V}$ or $V = \frac{k}{P}$	B1	si; allow e.g. $V \propto \frac{k}{P}$
$4 = \frac{k}{1020}$ oe or $k = 4 \times 1020$ (= 4080)	M1	
$(V =) \frac{4 \times 1020}{1360}$	M1	FT 'their 4×1020'
$(V =) 3$ (m^3)	A1	CAO
Alternative method: *$P_1V_1 = P_2V_2$ oe; soi*	*B1*	
$4 \times 1020 = V \times 1360$ seen, or implied in later working	*M1*	
Forms $(V =) \frac{4 \times 1020}{1360}$	*M1*	*FT 'their 4×1020'*
$(V =) 3 (m^3)$	*A1*	*CAO*
(b) $(P =) \frac{4080}{1 \cdot 2}$ or $(P =) \frac{4 \times 1020}{1 \cdot 2}$	M1	FT 'their $4 \times 1020' \div 1.2$
3400 (N/m^2)	A1	CAO
	(6)	

Direct / Inverse Proportion: Calculator

Question	Maximum Mark	Mark Awarded
#1	4	
#2	5	
#3	5	
#4	5	
#5	7	
Total	26	

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Marking Scheme

#1

GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
1270 – 900 (=370) $\frac{370}{400} \times 1000$ (=925) or $\frac{370}{400}$ × 600 (=555) 1270 – 925 or 900 - 555 345 (g)	M1 m1 m1 A1	 CAO If M1 m0 m0 A0 then award SC1 for an answer of 653(.33..g) from use of 400 ml remaining
Alternative method *1270 – 900 (=370)* *(Bottle and 200 ml have mass) 900 – 370 (= 530 g)* *(Mass of bottle =) 530 – 370 ÷ 2* *345 (g)*	*M1* *m1* *m1* *A1*	 *FT 'their 1270 – 900'* *CAO*
	(4)	

#2

	Mark	Comment
(a) y α 1/x OR y = k/x 124.5 = k/18 or k = 2241 y = 2241/x	B1 M1 A1	Allow y α k/x FT non linear only May be seen in part (b), must be sight of y = 2241/x, not for the implied use of this Do not accept y α 2241/x
(b) x: ½ | 18 | **24.9** y: **4482** | 2241 | 90	B2 (5)	FT their non linear expression B1 for each value Allow 24.9 given as 25 provided k = 2241 seen in (a) or (b)

#3

Component 2: Higher Tier	Mark	Comment
(a) $R \propto P\left(1-\frac{P}{100}\right)$ or $R = kP\left(1-\frac{P}{100}\right)$	M1	Allow for $R \propto kP\left(1-\frac{P}{100}\right)$
$0.02 = 50k\left(1-\frac{50}{100}\right)$ oe	M1	Award of this M1 implies the previous M1
$R = 0.0008P\left(1-\frac{P}{100}\right)$ or $R = \frac{P}{1250}\left(1-\frac{P}{100}\right)$ oe	A1	k = 0.0008 or $\frac{1}{1250}$ only Do not allow e.g. $R \propto 0.0008P\left(1-\frac{P}{100}\right)$ Mark final answer but allow the mark for sight of the correct equation in (b)
(b) $(0.0008\times)\ P\left(1-\frac{P}{100}\right) = 0$ or better	M1	Must see an equation used here FT 'their equation' of the form $R = kP\left(1-\frac{P}{100}\right)$ but allow $P\left(1-\frac{P}{100}\right) = 0$
P = 100	A1	Ignore P =0 if P = 100 given.
	(5)	

#4

Component 2: Higher Tier	Mark	Comment
(a) $t \propto \frac{1}{m^2}$ OR $t = \frac{k}{m^2}$	B1	
$38 = \frac{k}{3^2}$ or k = 342	M1	FT from B0 for a correct calculation of k from $t \propto \frac{1}{m}$ or $t \propto m^2$ or $t \propto \frac{1}{\sqrt{m}}$
$t = \frac{342}{m^2}$	A1	CAO *Note: This may be seen in (b).*
(b) $m^2 = \frac{342}{12}$ or $m = (\pm)\sqrt{28.5}$ or $m = (\pm)5.3(3..)$	M1	No marks for unsupported answers, work must follow from (a). FT provided at least M1 awarded in (a).
6 (mechanics)	A1	CAO
	(5)	

#5

Component 2: Higher Tier	Mark	Comment
$y \propto \frac{1}{w^3}$ or $y = \frac{k}{w^3}$ OR $w \propto \sqrt{x}$ or $w = c\sqrt{x}$	B1	
$\frac{1}{9} = \frac{k}{6^3}$	M1	FT $y \propto \frac{1}{w}$ or $y \propto w^3$ *Note: k = 24 implies M1*
$y = \frac{24}{w^3}$ oe	A1	CAO. May be seen in later work
$6 = c\sqrt{4}$	M1	FT $w \propto x^2$ *c = 3 implies M1*
$w = 3\sqrt{x}$	A1	CAO May be seen in later work
$y = \frac{24}{(3\sqrt{x})^3}$ or $y = \frac{8}{9(\sqrt{x})^3}$ oe	M1	FT provided M1 M1 previously awarded.
$y = \frac{8}{9}x^{\frac{-3}{2}}$	A1	Mark final answer. A0 on FT if $y = mx^n$ and m and n are not both fractions
Alternative method $y \propto \frac{1}{w^3}$ or $y = \frac{k}{w^3}$ OR $w \propto \sqrt{x}$ or $w = c\sqrt{x}$	*B1*	
(Substitutes in for w) $y = \frac{k}{(c\sqrt{x})^3}$	*M1*	*FT* $y \propto \frac{1}{w}$ *or* $y \propto w^3$ *or* $w \propto x^2$
(Changes constants) $y = \frac{k}{c^3(\sqrt{x})^3}$ or $y = \frac{P}{(\sqrt{x})^3}$ oe	*A1*	*CAO*
$\frac{1}{9} = \frac{P}{(\sqrt{4})^3}$	*M1*	
$P = \frac{8}{9}$ oe	*A1*	*CAO*
$y = \frac{24}{(3\sqrt{x})^3}$ or $y = \frac{8}{9(\sqrt{x})^3}$ oe	M1	FT provided M1 M1 previously awarded.
$y = \frac{8}{9}x^{\frac{-3}{2}}$	A1	Mark final answer. A0 on FT if $y = mx^n$ and m and n are not both fractions
	(7)	