22. The diagram shows a hexagon *ABCDEF*.

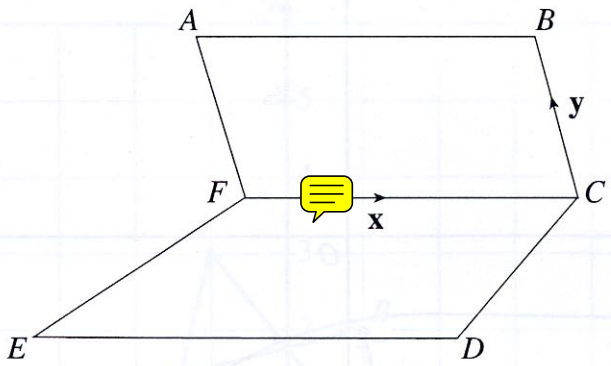

Diagram not drawn to scale.

ABCF is a parallelogram.

FC = x, CB = y, DC = $\frac{1}{2}(4\mathbf{x} + \mathbf{y})$ and **EF** = $\frac{1}{2}(8\mathbf{x} + \mathbf{y})$.

(a) Express each of the following in terms of **x** and **y**. Give your answers in the simplest form.

(i) **AB**

.....

[1]

(ii) **FB**

.....

[1]

(iii) **ED**

.....

.....

.....

[2]

(b) State the geometrical relationship between *FC* and *ED*.

.....

.....

.....

[2]

17. The diagram shows a cuboid *ABCDHGFE* with *M* the mid-point of *BF*.

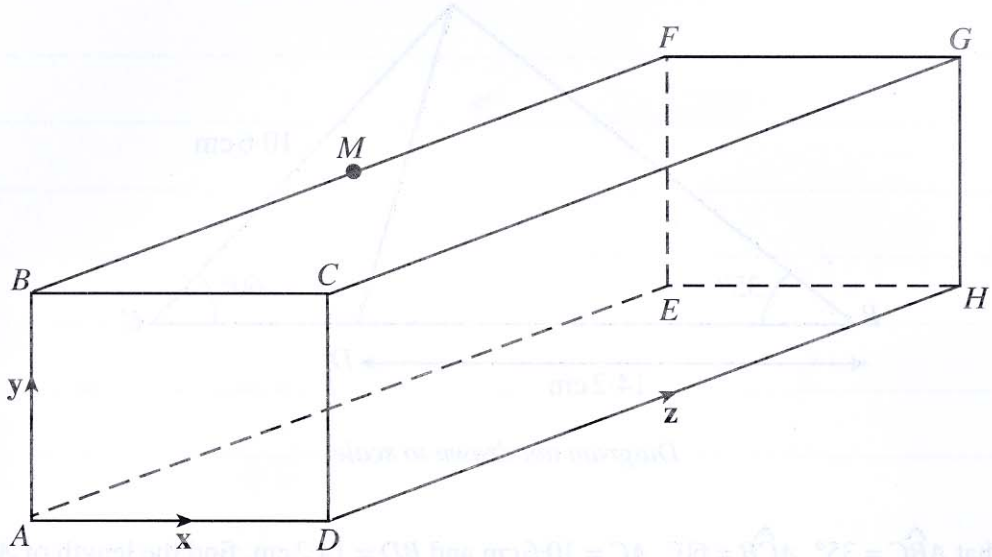

Diagram not drawn to scale.

Given that **AD** = **x**, **AB** = **y** and **DH** = **z**, express each of the following in terms of **x**, **y** and **z**. Give your answers in the simplest form.

(a) **AC**

.....

.....

(b) **AM**

.....

.....

.....

(c) **MH**

.....

.....

.....

[3]

20. The diagram shows a parallelogram $OXYZ$.

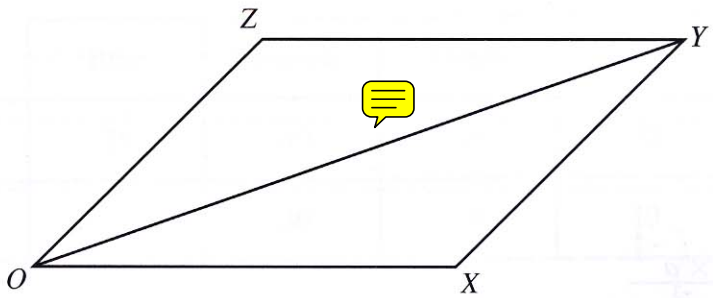

Diagram not drawn to scale.

The point P is on OX such that $OP : PX = 1 : 2$.
The point R is on OY such that $OR : RY = 1 : 5$.

(a) Given that $\mathbf{OX} = \mathbf{x}$ and $\mathbf{OY} = \mathbf{y}$, express each of the following in terms of $\mathbf{x}$ and $\mathbf{y}$.

(i) **OP**

.....

.....

(ii) **OR**

.....

.....

(iii) **YX**

.....

.....

.....

[3]

(b) Show that $\mathbf{ZX} = 6\mathbf{RP}$.

[3]

(c) Describe fully the geometrical relationship between ZX and RP.

[2]

21.

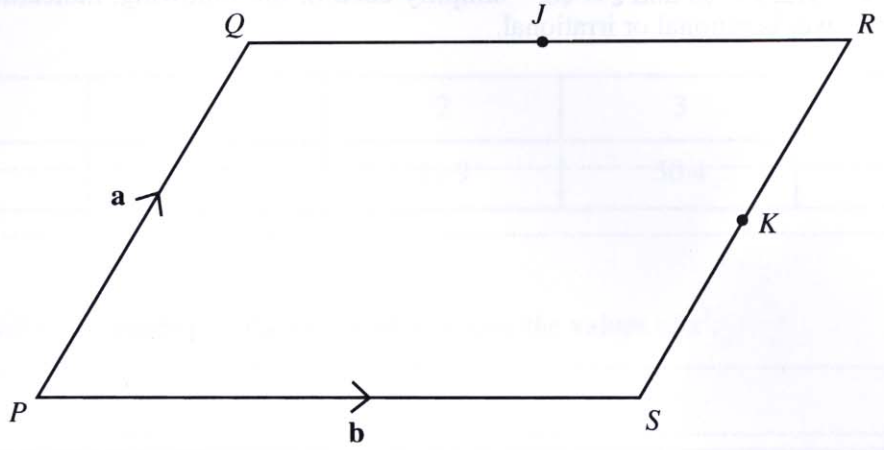

Diagram not drawn to scale.

PQRS is a parallelogram. The mid-point of *QR* is *J* and the mid-point of *RS* is *K*.

(a) Given that **PQ = a, PS = b**, express each of the following in terms of **a** and **b**.

(i) **PR**

.....

(ii) **QJ**

.....

(iii) **PK**

.....

(iv) **QS**

.....

(v) **JK**

.....

[5]

(b) Describe fully the geometrical relationships between *QS* and *JK*.

.....

.....

[2]