3. The diagram shows a circle with centre O.
The line PT is a tangent to the circle at T.
Given that $TP = 12{\cdot}8$ cm, $OP = 16{\cdot}5$ cm and $\hat{PTO} = 90°$, calculate the radius of the circle.

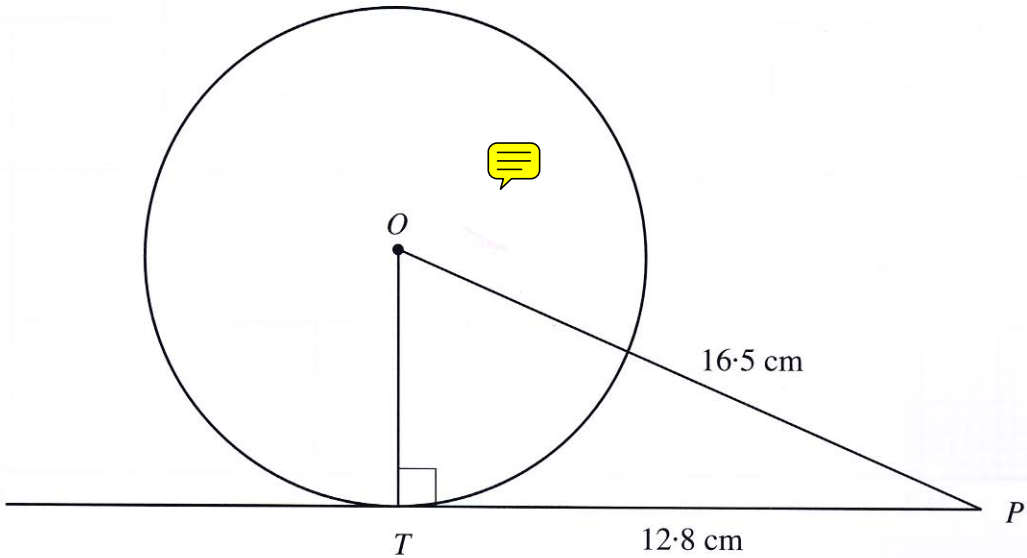

Diagram not drawn to scale.

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[3]

15. *(a)*

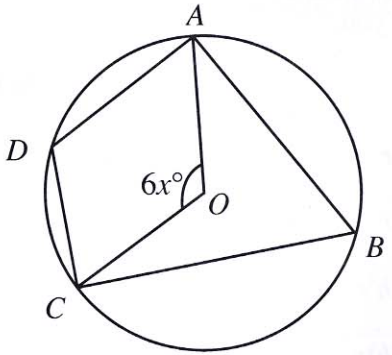

Diagram not drawn to scale.

The diagram shows four points A, B, C and D lying on the circumference of a circle centre O with $\hat{AOC} = 6x°$.

Find an expression for **each** of the following angles in terms of x.

(i) $\hat{ABC}$

.....

.....

[1]

(ii) $\hat{ADC}$

.....

.....

[1]

(b)

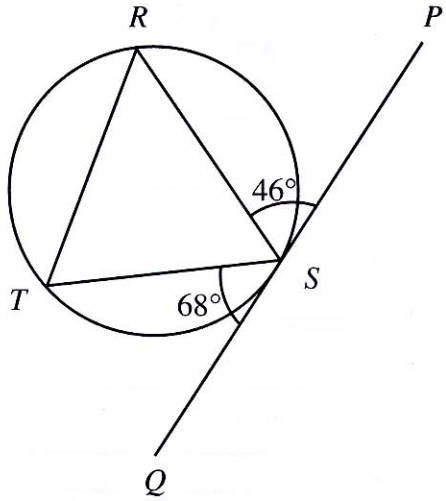

Diagram not drawn to scale.

Three points R, S and T lie on the circumference of the circle.
The tangent PQ touches the circle at S.

Find $\widehat{TRS}$, giving a reason for your answer.

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.....

[2]

22. The diagram shows a circle with centre O and chord JK.

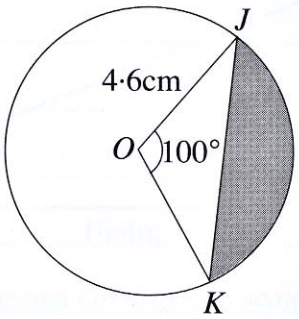

Diagram not drawn to scale.

The circle has a radius of 4·6 cm and $\hat{JOK} = 100°$.
Calculate the area of the shaded region.

[6]

17.

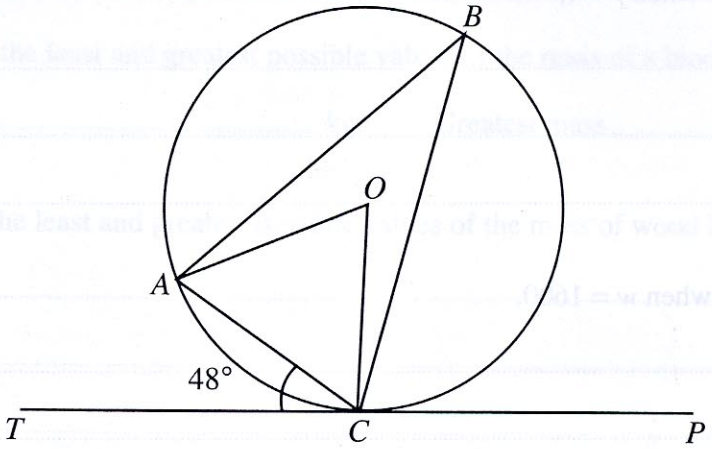

Diagram not drawn to scale.

The three points, *A*, *B* and *C* lie on the circumference of the circle with centre *O*.

The tangent *PT* touches the circle at *C* and $A\hat{C}T = 48°$.

Find **each** of the following angles, giving reasons for your answers.

(a) $O\hat{C}A$

.....

.....

.....

(b) $A\hat{B}C$

.....

.....

.....

.....

[3]

13.

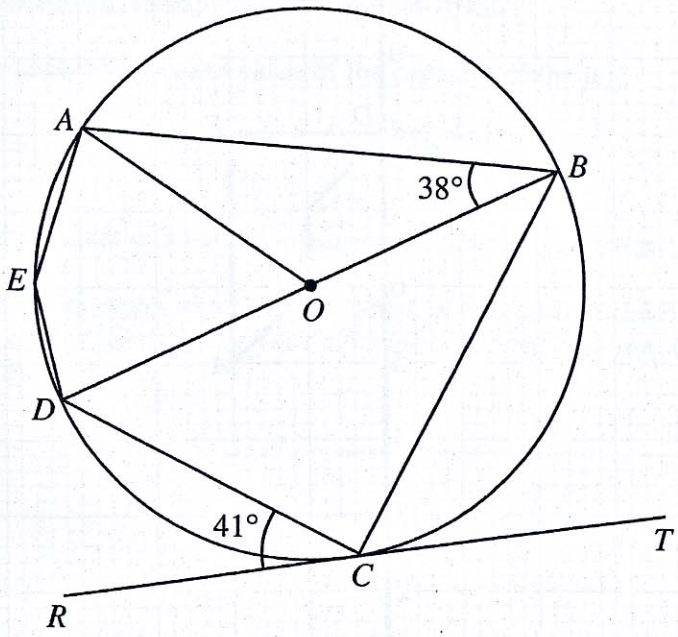

Diagram not drawn to scale.

Five points A, B, C, D and E lie on the circumference of the circle centre O with BOD a straight line.
The tangent RT touches the circle at C.

$\hat{ABD} = 38°$ and $\hat{DCR} = 41°$.

Find **each** of the following angles, giving reasons for your answers.

(a) $\hat{AED}$

.....

.....

.....

(b) $\hat{AOD}$

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.....

.....

(c) $\hat{BDC}$

.....

.....

.....

[4]

13. The four points A, B, C and D lie on the circumference of a circle centre O.
The tangent PQ touches the circle at C.
The point X on the tangent PQ is such that OAX is a straight line.

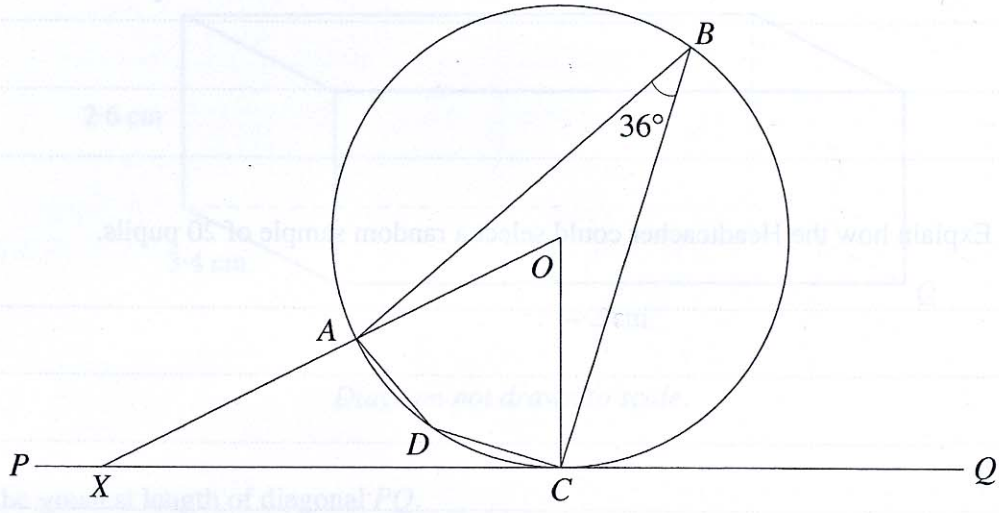

Diagram not drawn to scale.

Given that $A\hat{B}C = 36°$, find **each** of the following angles. Give reasons for your answers.

(a) $A\hat{O}C$

.....

.....

(b) $O\hat{X}C$

.....

.....

(c) $A\hat{D}C$

.....

.....

[4]

17. The diagram shows A, B, C and D are four points on the circumference of a circle centre O.
The diameter AOB is extended to P, so that $BP = BC$.
The tangent RT touches the circle at A.

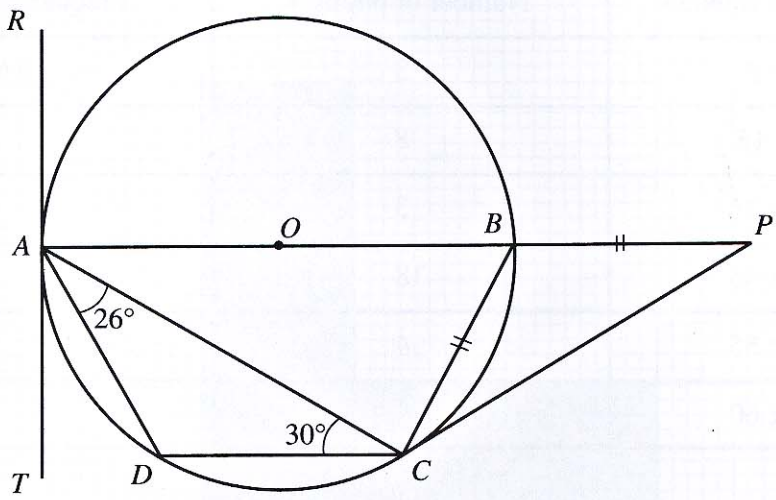

Diagram not drawn to scale.

Given that $A\hat{C}D = 30°$ and $C\hat{A}D = 26°$, find **each** of the following angles.

(a) $D\hat{A}T$

.....

[1]

(b) $B\hat{C}A$

.....

[1]

(c) $B\hat{P}C$

.....

[2]

(d) $D\hat{O}C$

.....

[1]