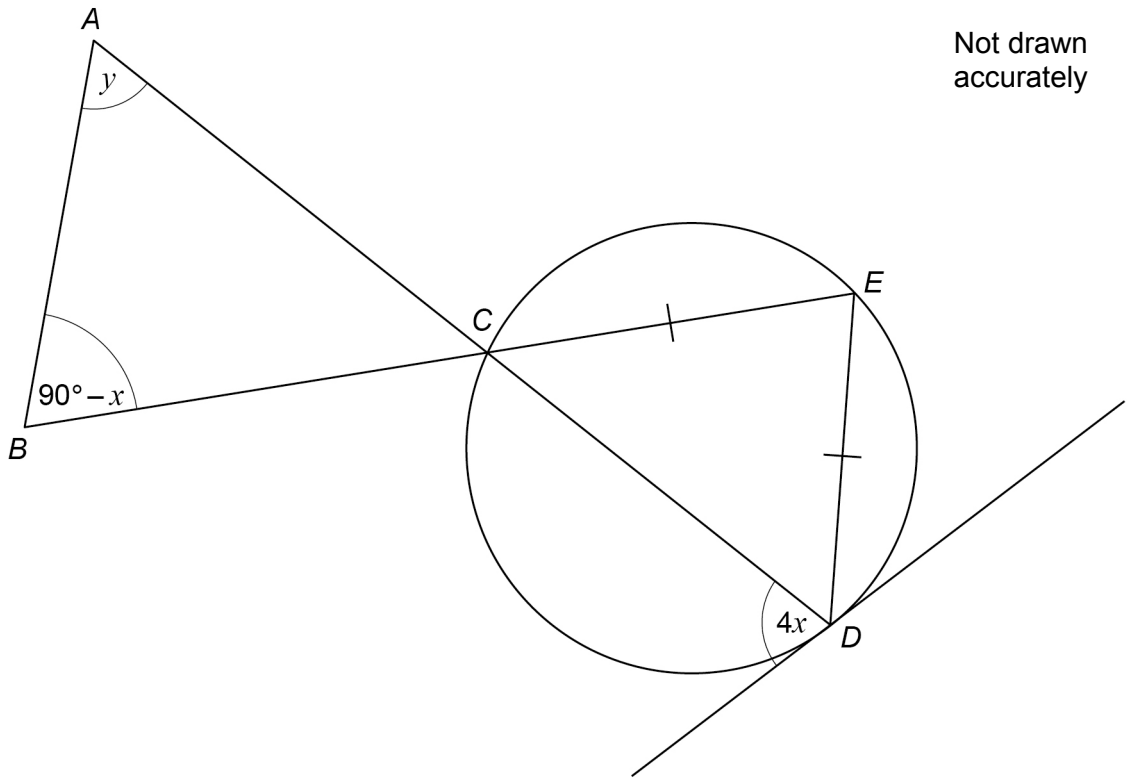
1 *C*, *D* and *E* are points on a circle.

CE = *DE*

The tangent at *D* is shown.

ACD and *BCE* are straight lines.



Not drawn accurately

Prove that $y = 3x$

[4 marks]

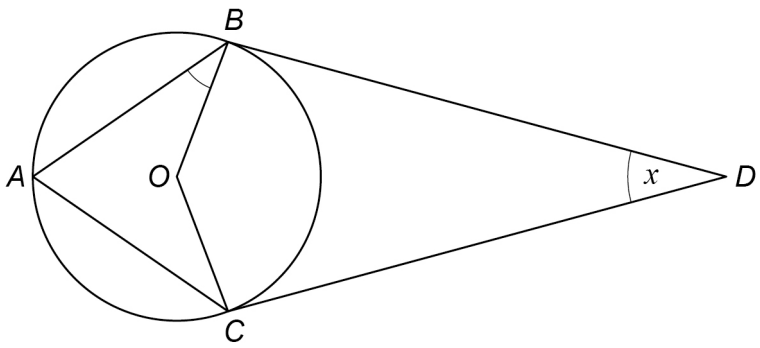
2 *A*, *B* and *C* are three points on the circumference of a circle, centre *O*.

BD and *CD* are tangents to the circle.

ABDC is a kite.

Angle *BDC* is x

Not drawn accurately

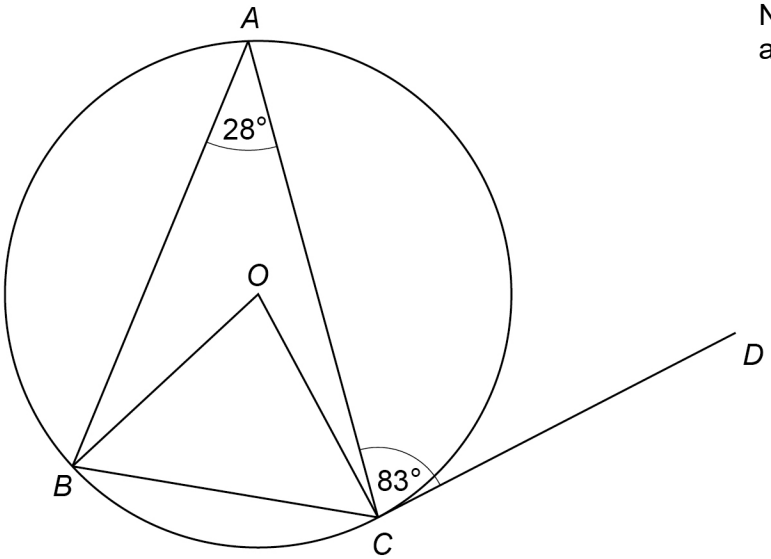


Prove that angle *ABO* is $45° - \frac{x}{4}$

[4 marks]

3 *A*, *B* and *C* are points on a circle, centre *O*.

DC is a tangent to the circle.



Not drawn accurately

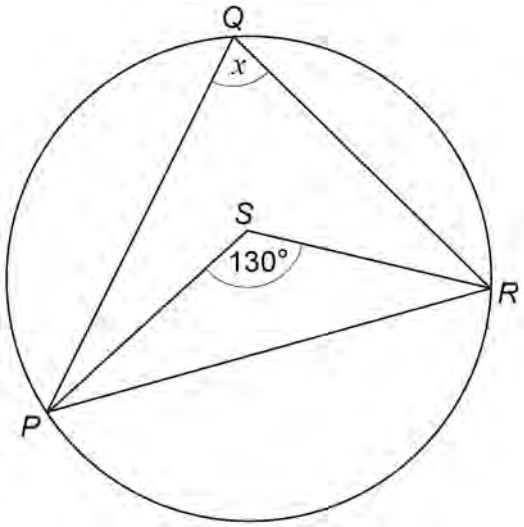
Show that angle *ABO* : angle *ACO* = 3 : 1

[5 marks]

4 (a) *P*, *Q* and *R* are points on a circle.

S is a point inside triangle *PQR*.

Not drawn accurately



Assume that *S* is the centre of the circle.

Work out the size of angle x.

[1 mark]

$x =$ _____ °

4 (b) In fact, the centre of the circle is on *PS* but **not** at *S*.

What does this mean about the size of angle x ?

Tick **one** box.

[1 mark]

☐ It is the same as the answer to part (a)

☐ It is greater than the answer to part (a)

☐ It is smaller than the answer to part (a)

☐ It is impossible to tell

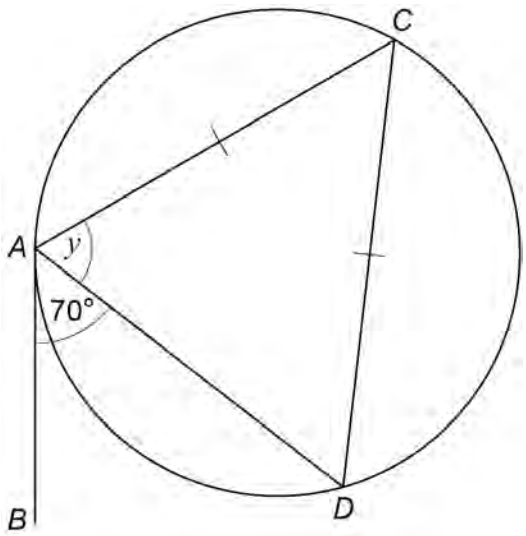
4 (c) For a different circle,

AB is a tangent at *A*

C and *D* are on the circumference of the circle

AC = *CD*

Not drawn accurately



Here is Simon's method to work out the size of angle y.

Angle *ADC* = 70° (alternate segment theorem)
Therefore y = 70° (angles in an isosceles triangle)

Is he correct?

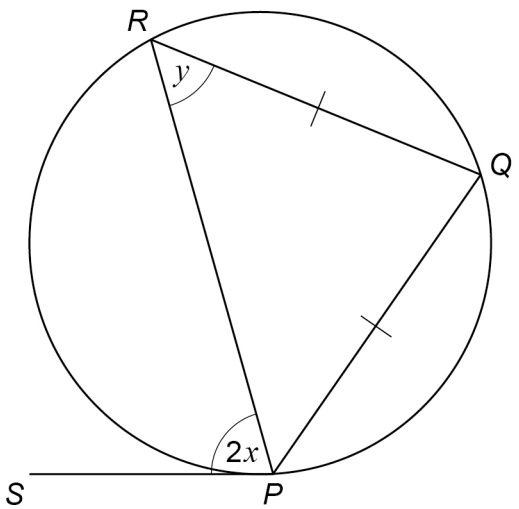
Give a reason for your answer.

[1 mark]

5 *P*, *Q* and *R* are points on a circle.

SP is a tangent to the circle.

$RQ = PQ$



Not drawn accurately

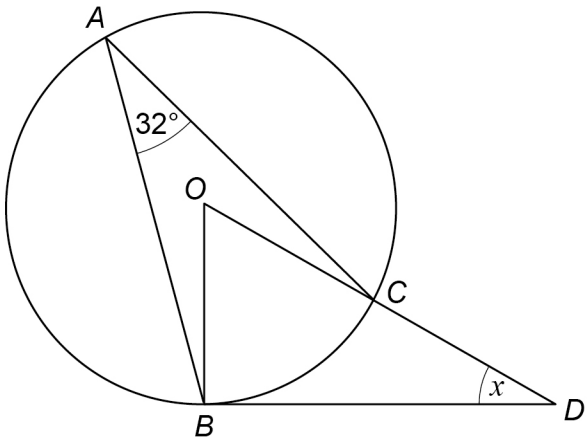
Prove that $y = 90° - x$

[4 marks]

6 *A*, *B* and *C* are points on a circle, centre *O*.

BD is a tangent to the circle.

OCD is a straight line.



Not drawn accurately

Work out the size of angle x.

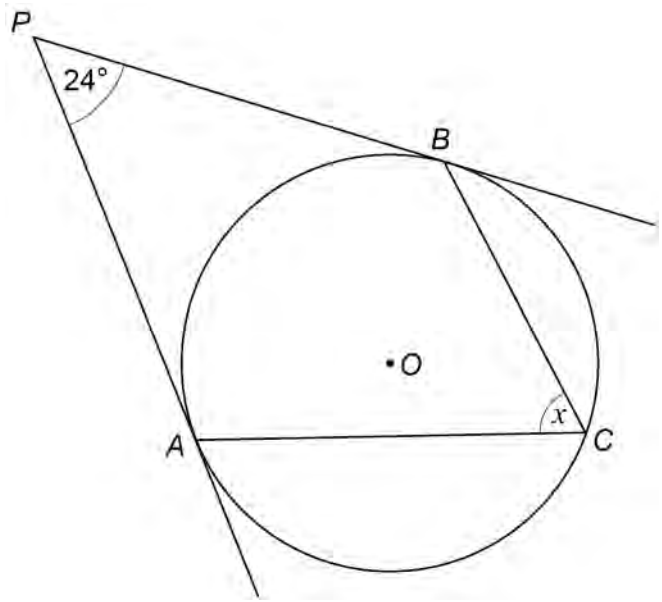
[3 marks]

$x =$ _____ degrees

7 *A*, *B* and *C* are points on a circle, centre *O*.

AP and *BP* are tangents to the circle.

Not drawn accurately



Work out the size of angle *x*.

[3 marks]

Answer _____ °