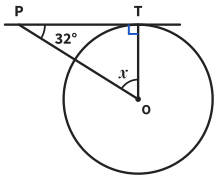
Circle Theorems: Tangents

ANSWERS

1

PT is a tangent to the circle, centre O.
Find x.



Angle OTP = 90°

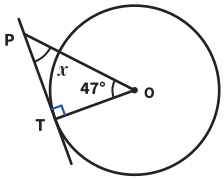
$x = 180 - 90 - 32$

Reason A tangent meets a radius at 90°.

$x =$ 58°

2

PT is a tangent to the circle, centre O.
Find x.



Angle OTP = 90°

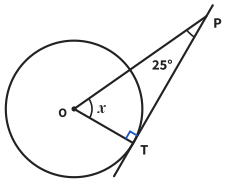
$x = 180 - 90 - 47$

Reason A tangent meets a radius at 90°.

$x =$ 43°

3

PT is a tangent to the circle, centre O.
Find x.



Angle OTP = 90°

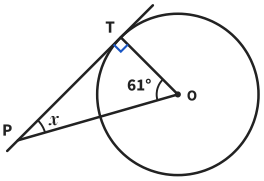
$x = 180 - 90 - 25$

Reason A tangent meets a radius at 90°.

$x =$ 65°

4

PT is a tangent to the circle, centre O.
Find x.



Angle OTP = 90°

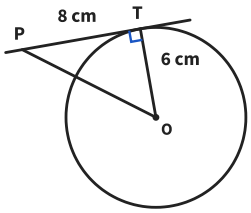
$x = 180 - 90 - 61$

Reason A tangent meets a radius at 90°.

$x =$ 29°

5

PT is a tangent to the circle, centre O.
Find OP.



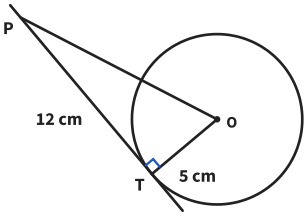
Angle OTP = 90°

$OP^2 = 6^2 + 8^2$

OP = 10 cm

6

PT is a tangent to the circle, centre O.
Find OP.



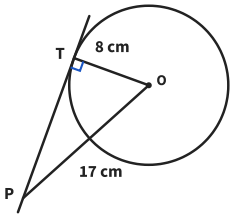
Angle OTP = 90°

$OP^2 = 5^2 + 12^2$

OP = 13 cm

7 Notice the change!

PT is a tangent to the circle, centre O.
Find PT.



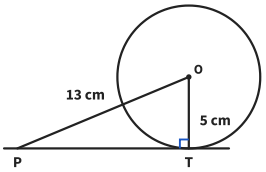
Angle OTP = 90°

$PT^2 = 17^2 - 8^2$

PT = 15 cm

8

PT is a tangent, centre O.
Ben says PT = 13 − 5 = 8 cm.
Explain his mistake and find PT.



He must use Pythagoras: angle OTP = 90°.

$PT^2 = 13^2 - 5^2 = 144$

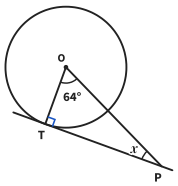
PT = 12 cm

Circle Theorems: Tangents *further practice*

ANSWERS

9

PT is a tangent to the circle, centre O.
Find x.



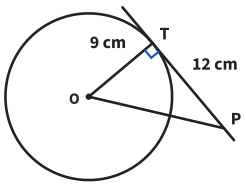
angle OTP = 90°

$x = 180 - 90 - 64$

$x =$ $x = 26°$

10

PT is a tangent to the circle, centre O.
Find OP.



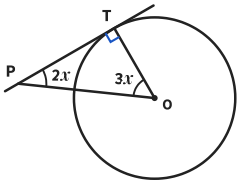
angle OTP = 90°

$OP^2 = 9^2 + 12^2 = 225$

OP = 15 cm

11

PT is a tangent to the circle, centre O.
Find x.



$2x + 3x + 90 = 180$

$5x = 90$

$x =$ $x = 18$

12

A wheel has radius 14 cm. A rope runs from a hook P, 50 cm from the centre of the wheel, and just touches the wheel at T. Find the length of rope PT.

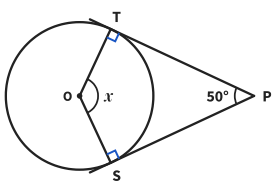
the radius to T meets the rope at 90°

$PT^2 = 50^2 - 14^2 = 2304$

Answer 48 cm

13

PT and PS are tangents to the circle, centre O. Find angle TOS, marked x.



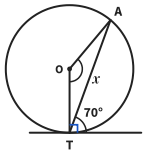
angles OTP and OSP are 90°

360 − 90 − 90 − 50 (quadrilateral)

Answer 130°

14

The line is a tangent at T, and O is the centre. The angle between the tangent and the chord TA is 70°.
Find angle TOA, marked x.



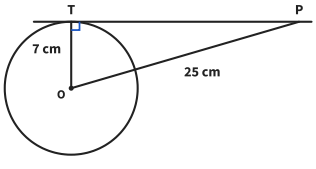
angle OTA = 90 − 70 = 20°

180 − 20 − 20 (OT = OA)

Answer 140°

15

PT is a tangent to the circle, centre O.
Find the perimeter of triangle OTP.



$PT^2 = 25^2 - 7^2$, PT = 24

7 + 24 + 25

Answer 56 cm

16

PT is a tangent to a circle with centre O.
Explain why OP is always longer than PT.

angle OTP = 90°, and OP is opposite it

the hypotenuse is the longest side

So OP is the hypotenuse