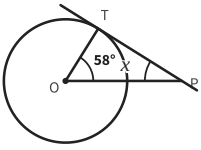


Circle Theorems: Tangents

ANSWERS

1 tangent meets radius at 90°

Find x .

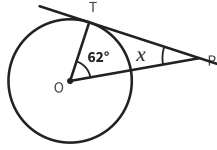


Angle OTP = 90° tangent meets radius at 90°

$$x = 180 - 90 - 58$$

$$x = 32^\circ$$

2 Find x .

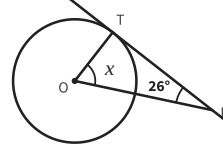


Angle OTP = 90° tangent meets radius at 90°

$$x = 180 - 90 - 62$$

$$x = 28^\circ$$

3 Find x .

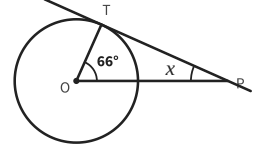


Angle OTP = 90° tangent meets radius at 90°

$$x = 180 - 90 - 26$$

$$x = 64^\circ$$

4 Find x .



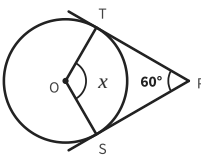
Angle OTP = 90° tangent meets radius at 90°

$$x = 180 - 90 - 66$$

$$x = 24^\circ$$

5 Notice the change!

Find x .

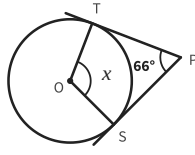


Angles at T and S = 90° tangent meets radius at 90°

$$x = 360 - 90 - 90 - 60$$

$$x = 120^\circ$$

6 Find x .

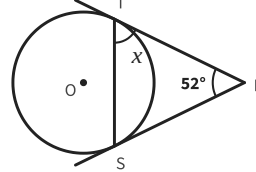


Angles at T and S = 90° tangent meets radius at 90°

$$x = 360 - 90 - 90 - 66$$

$$x = 114^\circ$$

7 Find x .

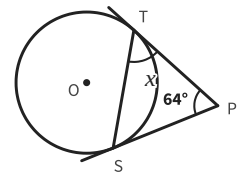


$PT = PS$ (equal tangents)

$$x = (180 - 52) \div 2$$

$$x = 64^\circ$$

8 Find x .



$PT = PS$ (equal tangents)

$$x = (180 - 64) \div 2$$

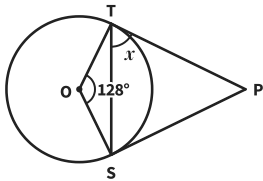
$$x = 58^\circ$$

Circle Theorems: Tangents further practice

ANSWERS

9

PT and PS are tangents and O is the centre. Find angle PTS, marked x .



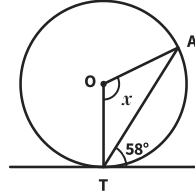
$$\text{angle } TPS = 360 - 90 - 90 - 128 = 52^\circ$$

$$x = (180 - 52) \div 2$$

$$\text{Answer } x = 64^\circ$$

10

The line is a tangent at T and O is the centre. Find angle TOA, marked x .



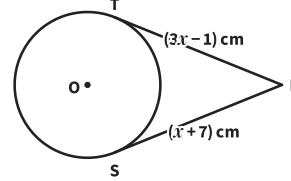
$$\text{angle } OTA = 90 - 58 = 32^\circ$$

$$OT = OA \text{ so } x = 180 - 2 \times 32$$

$$\text{Answer } x = 116^\circ$$

11

PT and PS are tangents to the circle. Find the length of PT.



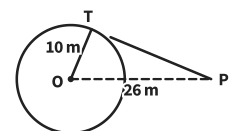
$$3x - 1 = x + 7 \text{ (tangents from a point are equal)}$$

$$x = 4, \text{ so } PT = 3 \times 4 - 1$$

$$\text{Answer } PT = 11 \text{ cm}$$

12

A drone at P is 26 m from the centre O of a round pond of radius 10 m. Its line of sight just touches the edge of the pond at T. Find PT.



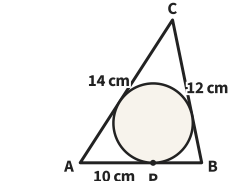
$$\text{angle } OTP = 90^\circ \text{ (tangent and radius)}$$

$$PT = \sqrt{26^2 - 10^2}$$

$$\text{Answer } 24 \text{ m}$$

13

A round cake sits in a triangular box ABC and touches all three sides. It touches AB at P. Find AP.



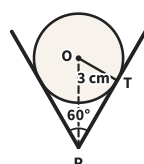
$$\text{equal tangents: } a + b = 10, b + c = 12, a + c = 14$$

$$a + b + c = 18, \text{ so } a = 18 - 12$$

$$\text{Answer } AP = 6 \text{ cm}$$

14

A ball of radius 3 cm rests in a V shaped holder. Both sides of the holder are tangents to the ball and meet at P at 60° . How far is the centre O from P?



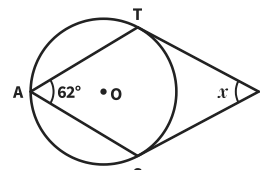
$$\text{angle } OPT = 30^\circ \text{ and angle } OTP = 90^\circ$$

$$\sin 30^\circ = 3 \div OP, \text{ so } OP = 3 \div 0.5$$

$$\text{Answer } OP = 6 \text{ cm}$$

15

PT and PS are tangents and O is the centre. Find angle TPS, marked x .



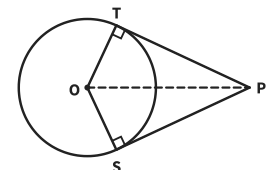
$$\text{angle } TOS = 2 \times 62 = 124^\circ \text{ (angle at the centre)}$$

$$x = 360 - 90 - 90 - 124 \text{ (kite OTPS)}$$

$$\text{Answer } x = 56^\circ$$

16

PT and PS are tangents from P. Explain why $PT = PS$.



$$OT = OS \text{ (radii)}, OP \text{ is shared, angles } OTP \text{ and } OSP \text{ are } 90^\circ$$

$$\text{so triangles } OTP \text{ and } OSP \text{ are congruent (RHS)}$$

$$\text{So } PT = PS$$