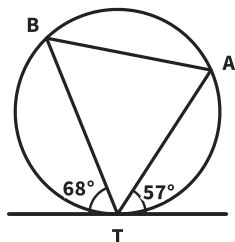


Circle Theorems: Alternate Segment *stretch*

ANSWERS

1

The line is a tangent to the circle at T. Find the three angles of triangle TAB.



Not drawn accurately

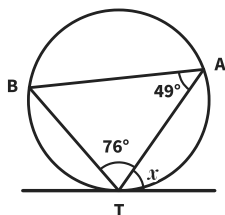
$$TBA = 57^\circ \text{ and } TAB = 68^\circ \text{ (alternate segment)}$$

$$ATB = 180 - 57 - 68 \text{ (angles on a straight line)}$$

Answer $TAB = 68^\circ, TBA = 57^\circ, ATB = 55^\circ$

2

The line is a tangent to the circle at T. Find the angle between the tangent and TA, marked x .



Not drawn accurately

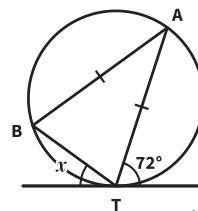
$$\text{angle } TBA = 180 - 49 - 76 = 55^\circ \text{ (angles in a triangle)}$$

$$x = \text{angle } TBA \text{ (alternate segment)}$$

Answer $x = 55^\circ$

3

A round rug touches a wall at T. Ribbons TA, TB and AB cross it, with $AT = AB$. Find angle x .



Not drawn accurately

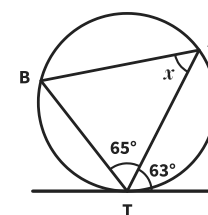
$$\text{angle } TBA = 72^\circ \text{ (alternate segment), so angle } ATB = 72^\circ \text{ (AT = AB)}$$

$$\text{angle } TAB = 180 - 72 - 72 = 36^\circ, \text{ and } x = \text{angle } TAB \text{ (alternate segment)}$$

Answer $x = 36^\circ$

4

The line is a tangent at T. Kai says $x = 63^\circ$ by the alternate segment theorem. Explain his mistake, then find x .



Not drawn accurately

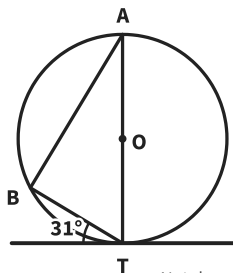
$$63^\circ \text{ is the angle at B, the angle in the other segment}$$

$$x = 180 - 63 - 65 \text{ (angles in a triangle)}$$

Answer $x = 52^\circ$

5

TA is a diameter and the line is a tangent at T. Find angles TAB and ATB.



Not drawn accurately

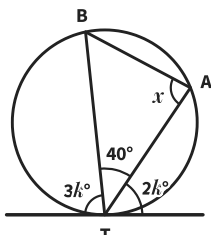
$$TAB = 31^\circ \text{ (alternate segment)}$$

$$TBA = 90^\circ \text{ (angle in a semicircle), so } ATB = 90 - 31$$

Answer $TAB = 31^\circ, ATB = 59^\circ$

6

The tangent at T makes angles with TA and TB in the ratio 2 : 3. Angle ATB = 40° . Find angle TAB, marked x .



Not drawn accurately

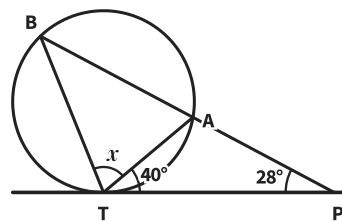
$$2k + 3k = 180 - 40 = 140, \text{ so } k = 28$$

$$x = 3k = 84^\circ \text{ (alternate segment)}$$

Answer $x = 84^\circ$

7

The tangent at T meets the line BA extended at P. Angle TPA = 28° and angle PTA = 40° . Find angle ATB, marked x .



Not drawn accurately

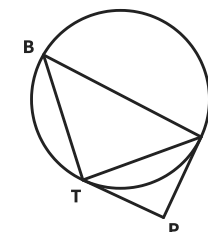
$$\text{angle } TBA = 40^\circ \text{ (alternate segment)}$$

$$\text{triangle PTB: } x = 180 - 28 - 40 - 40$$

Answer $x = 72^\circ$

8

PT and PA are tangents to the circle. Use the alternate segment theorem to explain why triangle PTA is isosceles.



$$\text{angle } PTA = \text{angle } TBA \text{ (alternate segment)}$$

$$\text{angle } PAT = \text{angle } TBA \text{ too, so the base angles are equal}$$

Reason $\text{angle } PTA = \text{angle } PAT$