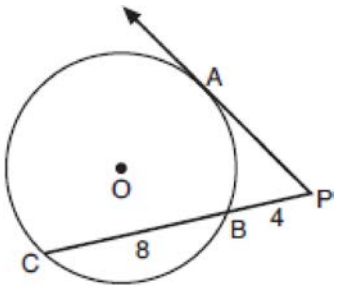
G.C.A.2: Chords, Secants and Tangents 8

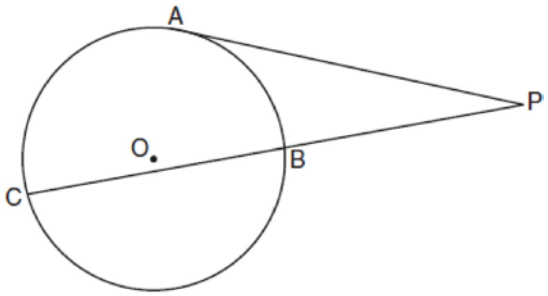
1 In the accompanying diagram, $\overrightarrow{PA}$ is tangent to circle O at A, $\overline{PBC}$ is a secant, $PB = 4$, and $BC = 8$.



What is the length of $\overline{PA}$?

1) $4\sqrt{6}$
2) $4\sqrt{2}$
3) $4\sqrt{3}$
4) 4

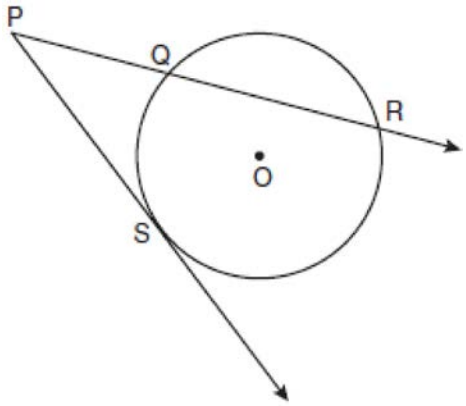
2 In the diagram below, tangent $\overline{PA}$ and secant $\overline{PBC}$ are drawn to circle O from external point P.



If $PB = 4$ and $BC = 5$, what is the length of $\overline{PA}$?

1) 20
2) 9
3) 8
4) 6

3 In the diagram below, $\overline{PS}$ is a tangent to circle O at point S, $\overline{PQR}$ is a secant, $PS = x$, $PQ = 3$, and $PR = x + 18$.

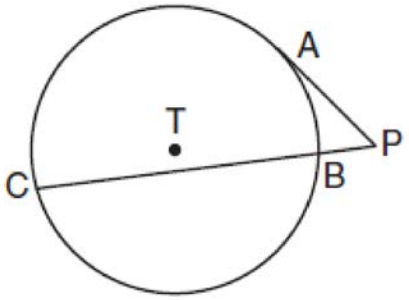


(Not drawn to scale)

What is the length of $\overline{PS}$?

1) 6
2) 9
3) 3
4) 27

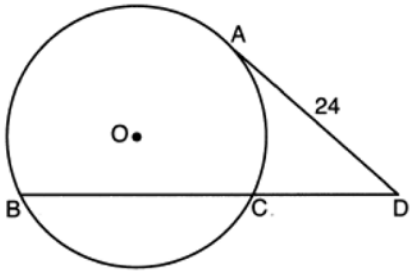
4 In the diagram shown below, $\overline{PA}$ is tangent to circle T at A, and secant $\overline{PBC}$ is drawn where point B is on circle T.



If $PB = 3$ and $BC = 15$, what is the length of $\overline{PA}$?

1) $3\sqrt{5}$
2) $3\sqrt{6}$
3) 3
4) 9

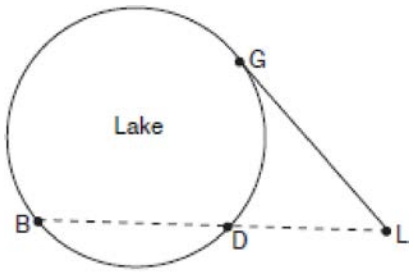
5 Circle O is drawn below with secant $\overline{BCD}$. The length of tangent $\overline{AD}$ is 24.



If the ratio of DC:CB is 4:5, what is the length of $\overline{CB}$?

1) 36
2) 20
3) 16
4) 4

6 In the accompanying diagram, cabins B and G are located on the shore of a circular lake, and cabin L is located near the lake. Point D is a dock on the lake shore and is collinear with cabins B and L. The road between cabins G and L is 8 miles long and is tangent to the lake. The path between cabin L and dock D is 4 miles long.

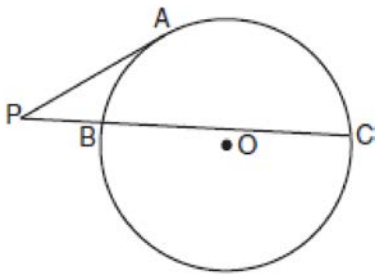


(Not drawn to scale)

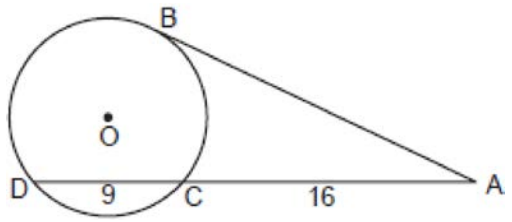
What is the length, in miles, of $\overline{BD}$?

1) 24
2) 12
3) 8
4) 4

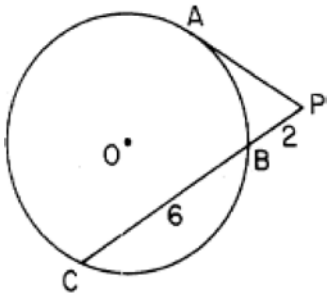
7 In the accompanying diagram, $\overline{PA}$ is tangent to circle O at A, secant $\overline{PBC}$ is drawn, $PB = 4$, and $BC = 12$. Find PA.



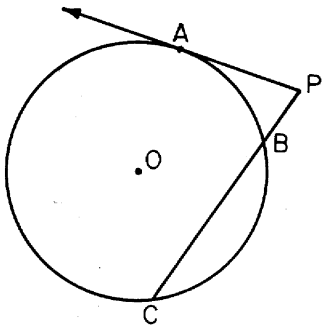
8 In the accompanying diagram, $\overline{AB}$ is tangent to circle O at B. If $AC = 16$ and $CD = 9$, what is the length of $\overline{AB}$?



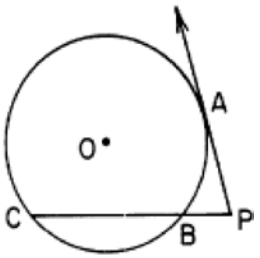
9 In the accompanying diagram of circle O, $\overline{PA}$ is a tangent and $\overline{PBC}$ is a secant. If $PB = 2$ and $BC = 6$, find PA.



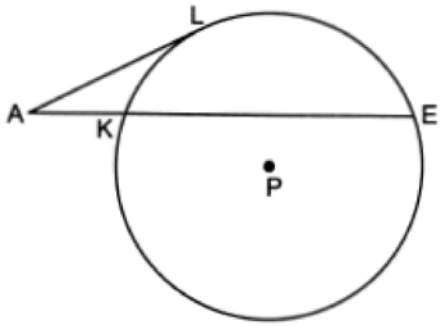
10 In the accompanying figure, $\overrightarrow{PA}$ is tangent to circle O at A, and $\overline{PBC}$ is a secant. If $PC = 16$ and $BC = 12$, find PA.



11 In the accompanying diagram, $\overrightarrow{PA}$ is tangent to circle O at A and $\overline{PBC}$ is a secant. If $CB = 9$ and $PB = 3$, find the length of $\overline{PA}$.

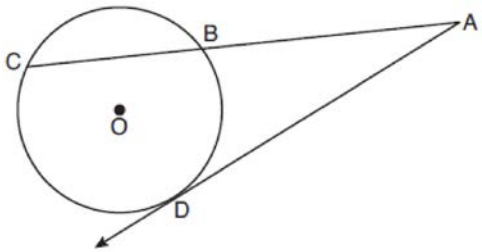


12 In circle P below, tangent $\overline{AL}$ and secant $\overline{AKE}$ are drawn.



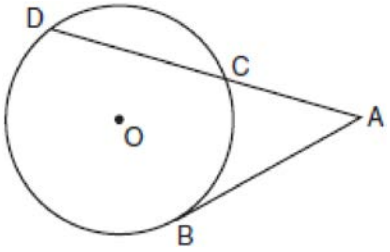
If $AK = 12$ and $KE = 36$, determine and state the length of $\overline{AL}$.

13 In the diagram below of circle O, secant $\overline{ABC}$ and tangent $\overline{AD}$ are drawn.

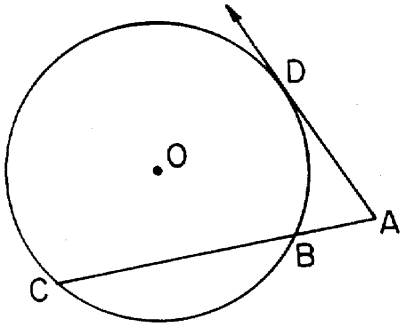


If $CA = 12.5$ and $CB = 4.5$, determine and state the length of $\overline{DA}$.

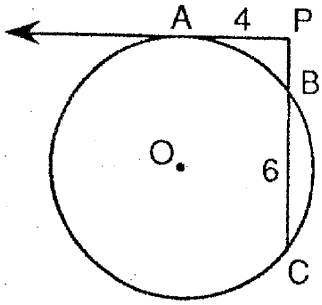
14 In the accompanying diagram, tangent $\overline{AB}$ and secant $\overline{ACD}$ are drawn to circle O from point A, $AB = 6$, and $AC = 4$. Find AD.



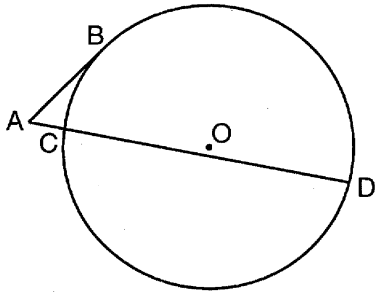
15 In the accompanying diagram, $\overrightarrow{AD}$ is tangent to circle O at D and $\overline{ABC}$ is a secant. If $AD = 4$ and $AC = 8$, find AB.



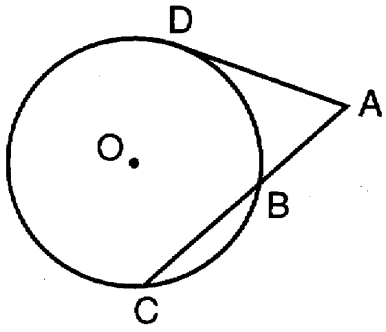
16 In the accompanying diagram, $\overrightarrow{PA}$ is tangent to circle O and $\overline{PBC}$ is a secant. If $PA = 4$ and $BC = 6$, find PB.



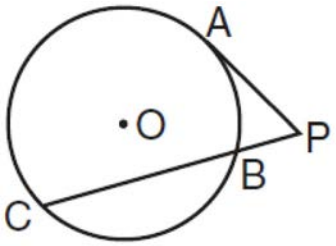
17 In the accompanying diagram, $\overline{AB}$ is tangent to circle O at B and $\overline{ACD}$ is a secant. If $AB = 9$ and $AD = 27$, find AC.



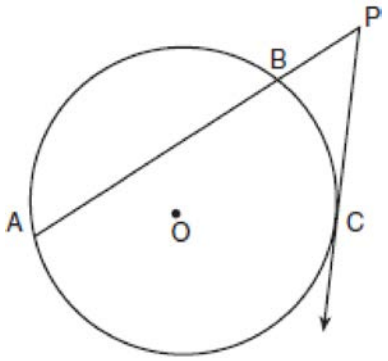
18 In the accompanying diagram, $\overline{AD}$ is tangent to circle O at D and $\overline{ABC}$ is a secant. If $AD = 6$ and $AC = 9$, find AB.



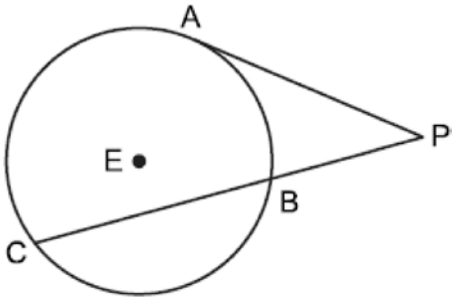
19 In the accompanying diagram, tangent $\overline{PA}$ and secant $\overline{PBC}$ are drawn to circle O from external point P. If $PA = 8$ and $PB = 4$, find the length of $\overline{BC}$.



20 In the accompanying diagram, $\overrightarrow{PC}$ is tangent to circle O, $\overline{PBA}$ is a secant, $PC = 6$, and $PB = 3$. Find AB.

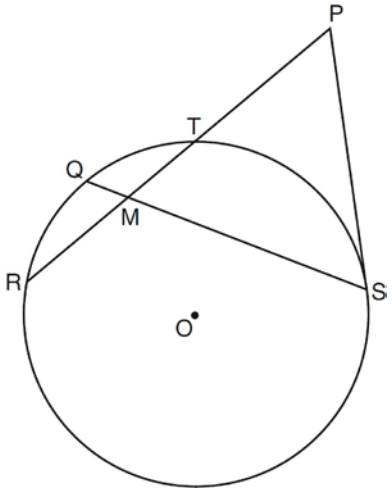


21 In circle E below, tangent $\overline{PA}$ and secant $\overline{PBC}$ are drawn.



If $PB = 9$ and $BC = 16$, determine and state the length of $\overline{PA}$.

22 In the diagram below of circle O, chords $\overline{RT}$ and $\overline{QS}$ intersect at M. Secant $\overline{PTR}$ and tangent $\overline{PS}$ are drawn to circle O. The length of $\overline{RM}$ is two more than the length of $\overline{TM}$, $QM = 2$, $SM = 12$, and $PT = 8$.



Find the length of $\overline{RT}$. Find the length of $\overline{PS}$.

G.C.A.2: Chords, Secants and Tangents 8
Answer Section

1 ANS: 3

If a tangent and a secant intersect outside a circle, the tangent squared will equal the product of the secant and its external segment. $x^2 = 4(8+4)$. $x^2 = 48$ $x = 4\sqrt{3}$

REF: 080719b

2 ANS: 4

$x^2 = (4+5) \times 4$

$x^2 = 36$

$x = 6$

REF: 011008ge

3 ANS: 2

$x^2 = 3(x+18)$

$x^2 - 3x - 54 = 0$

$(x-9)(x+6) = 0$

$x = 9$

REF: fall0817ge

4 ANS: 2

$x^2 = 3 \cdot 18$

$x = \sqrt{3 \cdot 3 \cdot 6}$

$x = 3\sqrt{6}$

REF: 081712geo

5 ANS: 2

$24^2 = 4x \cdot 9x \;\; 5 \cdot 4 = 20$

$576 = 36x^2$

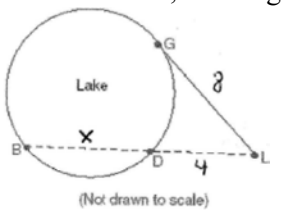
$16 = x^2$

$4 = x$

REF: 012312geo

6 ANS: 2

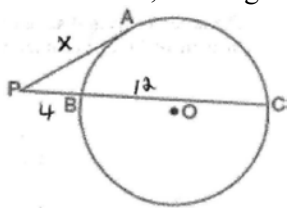
If a tangent and a secant intersect outside a circle, the tangent squared will equal the product of the secant and its external segment. $4(x+4) = 8^2$ $4x + 16 = 64$. $x = 12$



REF: 080103b

7 ANS:

8. If a tangent and a secant intersect outside a circle, the tangent squared will equal the product of the secant and its external segment. $x^2 = 4(12+4)$ $x^2 = 64$. $x = 8$



REF: 010623b

8 ANS:

20. If a tangent and a secant intersect outside a circle, the tangent squared will equal the product of the secant and its external segment. $x^2 = 16(16+9)$ $x^2 = 400$. $x = 20$

REF: 010821b

9 ANS:

4

REF: 068805siii

10 ANS:

8

REF: 068914siii

11 ANS:

6

REF: 089011siii

12 ANS:

$x^2 = 12 \cdot 48$

$x = 24$

REF: 062428geo

13 ANS:
$x^2 = 8 \times 12.5$

$x = 10$

REF: 012028geo

14 ANS:
9

REF: 010416siii

15 ANS:
2

REF: 068607siii

16 ANS:
2

REF: 019408siii

17 ANS:
3

REF: 019701siii

18 ANS:
4

REF: 089715siii

19 ANS:
12

REF: 010314siii

20 ANS:
9

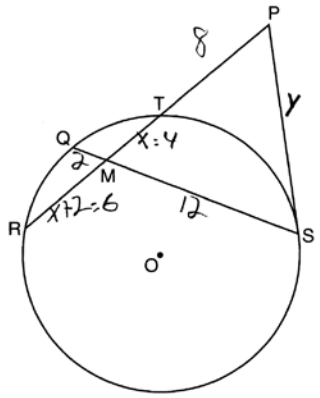
REF: 060314siii

21 ANS:
$x^2 = 9 \times 25$

$x = 15$

REF: 012530geo

22 ANS:



$x(x+2) = 12 \cdot 2$. $\overline{RT} = 6 + 4 = 10$. $y \cdot y = 18 \cdot 8$

$x^2 + 2x - 24 = 0$ $\qquad$ $y^2 = 144$

$(x+6)(x-4) = 0$ $\qquad$ $y = 12$

$x = 4$

REF: 061237ge