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

1 In the accompanying diagram,  $\overrightarrow{PA}$  is tangent to circle *O* at *A*,  $\overrightarrow{PBC}$  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 *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

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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 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, 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.



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



11 In the accompanying diagram, 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 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  $\overline{DA}$ .

13 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.



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



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



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16 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.



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



18 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  $\overline{BC}$ .



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



20 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

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1 ANS: 3
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If a tangent and a secant intersect outside a circle, the tangent squared will equal the product of the secant and its

 $x^2 = 4(8+4)$ external segment.  $x^2 = 48$ .  $x = 4\sqrt{3}$ 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 = xREF: 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



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



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REF: 010623b

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8 ANS:
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20. If a tangent and a secant intersect outside a circle, the tangent squared will equal the product of the secant and  $x^2 = 16(16 + 9)$ 

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its external segment. 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 = 8 \times 12.5
    x = 10
    REF: 012028geo
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REF: 061237ge