Regents Exam Questions G.C.A.2: Chords, Secants and Tangents 8 Name: $\qquad$ www.jmap.org

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

1 In the accompanying diagram, $\overrightarrow{P A}$ is tangent to circle $O$ at $A, \overline{P B C}$ is a secant, $P B=4$, and $B C=8$.


What is the length of $\overline{P A}$ ?

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

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


If $P B=4$ and $B C=5$, what is the length of $\overline{P A}$ ?

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

3 In the diagram below, $\overline{P S}$ is a tangent to circle $O$ at point $S, \overline{P Q R}$ is a secant, $P S=x, P Q=3$, and $P R=x+18$.

(Not drawn to scale)
What is the length of $\overline{P S}$ ?

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

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


If $P B=3$ and $B C=15$, what is the length of $\overline{P A}$ ?

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

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5 Circle $O$ is drawn below with secant $\overline{B C D}$. The length of tangent $\overline{A D}$ is 24 .


If the ratio of $D C: C B$ is $4: 5$, what is the length of $\overline{C B}$ ?

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.


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

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

7 In the accompanying diagram, $\overline{P A}$ is tangent to circle $O$ at $A$, secant $\overline{P B C}$ is drawn, $P B=4$, and $B C=12$. Find $P A$.


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


9 In the accompanying diagram of circle $O, \overline{P A}$ is a tangent and $\overline{P B C}$ is a secant. If $P B=2$ and $B C=6$, find $P A$.


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


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


12 In the diagram below of circle $O$, secant $\overline{A B C}$ and tangent $\overline{A D}$ are drawn.


If $C A=12.5$ and $C B=4.5$, determine and state the length of $\overline{D A}$.

13 In the accompanying diagram, tangent $\overline{A B}$ and secant $\overline{A C D}$ are drawn to circle $O$ from point $A$, $A B=6$, and $A C=4$. Find $A D$.


14 In the accompanying diagram, $\overrightarrow{A D}$ is tangent to circle $O$ at $D$ and $\overline{A B C}$ is a secant. If $A D=4$ and $A C=8$, find $A B$.


15 In the accompanying diagram, $\overrightarrow{P A}$ is tangent to circle $O$ and $P B C$ is a secant. If $P A=4$ and $B C=6$, find $P B$.


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16 In the accompanying diagram, $\overline{A B}$ is tangent to circle $O$ at $B$ and $A C D$ is a secant. If $A B=9$ and $A D=27$, find $A C$.


17 In the accompanying diagram, $\overline{A D}$ is tangent to circle $O$ at $D$ and $A B C$ is a secant. If $A D=6$ and $A C=9$, find $A B$.


18 In the accompanying diagram, tangent $\overline{P A}$ and secant $\overline{P B C}$ are drawn to circle $O$ from external point $P$. If $P A=8$ and $P B=4$, find the length of $\overline{B C}$.


19 In the accompanying diagram, $\overrightarrow{P C}$ is tangent to circle $O, \overline{P B A}$ is a secant, $P C=6$, and $P B=3$. Find $A B$.


20 In the diagram below of circle $O$, chords $\overline{R T}$ and $\overline{Q S}$ intersect at $M$. Secant $\overline{P T R}$ and tangent $\overline{P S}$ are drawn to circle $O$. The length of $\overline{R M}$ is two more than the length of $\overline{T M}, Q M=2, S M=12$, and $P T=8$.


Find the length of $\overline{R T}$. Find the length of $\overline{P S}$.

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## 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

$$
x^{2}=4(8+4)
$$

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

$$
\begin{aligned}
x^{2} & =3(x+18) \\
x^{2}-3 x-54 & =0 \\
(x-9)(x+6) & =0 \\
x & =9
\end{aligned}
$$

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
$24^{2}=4 x \cdot 9 x 5 \cdot 4=20$
$576=36 x^{2}$
$16=x^{2}$
$4=x$
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


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

$$
x^{2}=4(12+4)
$$

its external segment. $x^{2}=64$


$$
x=8
$$

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

$$
x^{2}=16(16+9)
$$

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

13 ANS:
9
REF: 010416siii
14 ANS:
2

REF: 068607siii
15 ANS:
2
REF: 019408siii
16 ANS:
3
REF: 019701siii
17 ANS:
4
REF: 089715siii
18 ANS:
12
REF: 010314siii
19 ANS:
9
REF: 060314siii
20 ANS:


$$
\begin{array}{rlrl}
x(x+2) & =12 \cdot 2 \cdot \overline{R T}=6+4=10 . y \cdot y & =18 \cdot 8 \\
x^{2}+2 x-24 & =0 & y^{2} & =144 \\
(x+6)(x-4) & =0 & y & =12
\end{array}
$$

REF: 061237ge

