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Name: $\qquad$

## G.SRT.B.5: Similarity 5

1 In the diagram below of right triangle $A C B$, altitude $\overline{C D}$ is drawn to hypotenuse $\overline{A B}$.


If $A B=36$ and $A C=12$, what is the length of $\overline{A D}$ ?

1) 32
2) 6
3) 3
4) 4

2 In the diagram below of right triangle $A B C, \overline{C D}$ is the altitude to hypotenuse $\overline{A B}, C B=6$, and $A D=5$.


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

1) 5
2) 9
3) 3
4) 4

3 In the diagram below, $\overline{Q M}$ is an altitude of right triangle $P Q R, P M=8$, and $R M=18$.


What is the length of $\overline{Q M}$ ?

1) 20
2) 16
3) 12
4) 10
$4 \frac{\text { In the diagram below, the length of the legs } \overline{A C} \text { and }}{\overline{B C}}$ $\overline{B C}$ of right triangle $A B C$ are 6 cm and 8 cm , respectively. Altitude $\overline{C D}$ is drawn to the hypotenuse of $\triangle A B C$.


What is the length of $\overline{A D}$ to the nearest tenth of $a$ centimeter?

1) 3.6
2) 6.0
3) 6.4
4) 4.0

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5 In the diagram below of right triangle $A B C$, altitude $\overline{B D}$ is drawn to hypotenuse $\overline{A C}, A C=16$, and $C D=7$.


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

1) $3 \sqrt{7}$
2) $4 \sqrt{7}$
3) $7 \sqrt{3}$
4) 12

6 In the diagram below of right triangle $A B C$, altitude $\overline{C D}$ is drawn to hypotenuse $\overline{A B}$.


If $A D=\underline{3}$ and $D B=12$, what is the length of altitude $\overline{C D}$ ?

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

Name: $\qquad$

7 In right triangle $A B C$ shown in the diagram below, altitude $\overline{B D}$ is drawn to hypotenuse $\overline{A C}, C D=12$, and $A D=3$.


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

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

8 Triangle $A B C$ shown below is a right triangle with altitude $\overline{A D}$ drawn to the hypotenuse $\overline{B C}$.


If $B D=2$ and $D C=10$, what is the length of $\overline{A B}$ ?

1) $2 \sqrt{2}$
2) $2 \sqrt{5}$
3) $2 \sqrt{6}$
4) $2 \sqrt{30}$

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9 In the diagram below of right triangle $A B C, \overline{C D}$ is the altitude to hypotenuse $\overline{A B}, A D=3$, and $D B=4$.


What is the length of $\overline{C B}$ ?

1) $2 \sqrt{3}$
2) $\sqrt{21}$
3) $2 \sqrt{7}$
4) $4 \sqrt{3}$

10 In $\triangle P Q R, \angle P R Q$ is a right angle and $\overline{R T}$ is drawn perpendicular to hypotenuse $\overline{P Q}$. If $P T=x$, $R T=6$, and $T Q=4 x$, what is the length of $\overline{P Q}$ ?

1) 9
2) 12
3) 3
4) 15

Name: $\qquad$

11 The accompanying diagram shows a 24 -foot ladder leaning against a building. A steel brace extends from the ladder to the point where the building meets the ground. The brace forms a right angle with the ladder.


If the steel brace is connected to the ladder at a point that is 10 feet from the foot of the ladder, which equation can be used to find the length, $x$, of the steel brace?

1) $\frac{10}{x}=\frac{x}{14}$
2) $\frac{10}{x}=\frac{x}{24}$
3) $10^{2}+x^{2}=14^{2}$
4) $10^{2}+x^{2}=24^{2}$

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12 The accompanying diagram shows part of the architectural plans for a structural support of a building. PLAN is a rectangle and $\overline{A S} \perp \overline{L N}$.


Which equation can be used to find the length of $\overline{A S}$ ?

1) $\frac{L S}{A S}=\frac{A S}{S N}$
2) $\frac{A N}{L N}=\frac{A S}{L S}$
3) $\frac{A S}{S N}=\frac{A S}{L S}$
4) $\frac{A S}{L S}=\frac{L S}{S N}$

13 In the diagram below of right triangle $A B C$, an altitude is drawn to the hypotenuse $\overline{A B}$.


Which proportion would always represent a correct relationship of the segments?

1) $\frac{c}{z}=\frac{z}{y}$
2) $\frac{c}{a}=\frac{a}{y}$
3) $\frac{x}{z}=\frac{z}{y}$
4) $\frac{y}{b}=\frac{b}{x}$

Name: $\qquad$

14 In right triangle $A B C$ shown below, altitude $\overline{B D}$ is drawn to hypotenuse $\overline{A C}$.


If $A D=8$ and $D C=10$, determine and state the length of $\overline{A B}$.

15 In the diagram below, $\triangle R S T$ is a $3-4-5$ right triangle. The altitude, $h$, to the hypotenuse has been drawn. Determine the length of $h$.


16 Four streets in a town are illustrated in the accompanying diagram. If the distance on Poplar Street from $F$ to $P$ is 12 miles and the distance on Maple Street from $E$ to $M$ is 10 miles, find the distance on Maple Street, in miles, from $M$ to $P$.


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17 The drawing for a right triangular roof truss, represented by $\triangle A B C$, is shown in the accompanying diagram. If $\angle A B C$ is a right angle, altitude $B D=4$ meters, and $\overline{D C}$ is 6 meters longer than $\overline{A D}$, find the length of base $\overline{A C}$ in meters.


18 In the diagram below of right triangle $A C B$, altitude $\overline{C D}$ intersects $\overline{A B}$ at $D$. If $A D=3$ and $D B=4$, find the length of $\overline{C D}$ in simplest radical form.


19 In right triangle $A B C$ below, $\overline{C D}$ is the altitude to hypotenuse $\overline{A B}$. If $C D=6$ and the ratio of $A D$ to $A B$ is 1:5, determine and state the length of $\overline{B D}$. [Only an algebraic solution can receive full credit.]


Name: $\qquad$

20 In right triangle $F G H$ shown below, $\mathrm{m} \angle G H F=90$, altitude $\overline{H J}$ is drawn to $\overline{F G}, F J=16$, and $H G=15$.


Determine and state the length of $\overline{J G}$. Determine and state the length of $\overline{H J}$. [Only algebraic solutions can receive full credit.]

21 In the diagram below, right triangle $R S U$ is inscribed in circle $O$, and $\overline{U T}$ is the altitude drawn to hypotenuse $\overline{R S}$. The length of $\overline{R T}$ is 16 more than the length of $\overline{T S}$ and $T U=15$. Find the length of $\overline{T S}$. Find, in simplest radical form, the length of $\overline{R U}$.


## G.SRT.B.5: Similarity 5

Answer Section
1 ANS: 4
Let $\overline{A D}=x . \quad 36 x=12^{2}$

$$
x=4
$$

REF: 080922ge
2 ANS: 4
$6^{2}=x(x+5)$
$36=x^{2}+5 x$
$0=x^{2}+5 x-36$
$0=(x+9)(x-4)$
$x=4$
REF: 011123ge
3 ANS: 3
$x^{2}=8 \times 18$
$x^{2}=144$
$x=12$
REF: 061506ge
4 ANS: 1
$\overline{A B}=10$ since $\triangle A B C$ is a 6-8-10 triangle. $6^{2}=10 x$

$$
3.6=x
$$

REF: 060915ge
5 ANS: 1
$x^{2}=7(16-7)$
$x^{2}=63$
$x=\sqrt{9} \sqrt{7}$
$x=3 \sqrt{7}$
REF: 061128ge
6 ANS: 1
$x^{2}=3 \times 12$
$x=6$
REF: 011308ge

7 ANS: 3

$$
\begin{aligned}
x^{2} & =3 \times 12 . \quad \sqrt{6^{2}+3^{2}}=\sqrt{45}=\sqrt{9} \sqrt{5}=3 \sqrt{5} \\
x & =6
\end{aligned}
$$

REF: 061327ge
8 ANS: 3
$x^{2}=2(2+10)$
$x^{2}=24$
$x=\sqrt{24}=\sqrt{4} \sqrt{6}=2 \sqrt{6}$
REF: 081326ge
9 ANS: 3
$x^{2}=4.7$
$x=\sqrt{4} \cdot \sqrt{7}$
$x=2 \sqrt{7}$
REF: 081528ge
10 ANS: 4
$x \cdot 4 x=6^{2} . P Q=4 x+x=5 x=5(3)=15$

$$
\begin{aligned}
4 x^{2} & =36 \\
x & =3
\end{aligned}
$$

REF: 011227ge
11 ANS: $1 \quad$ REF: 010619b
12 ANS: 1 REF: 010920b
13 ANS: 3 REF: 081410ge
14 ANS:
$x^{2}=8(10+8)$
$x^{2}=144$
$x=12$
REF: 061431ge
15 ANS:
2.4. $5 a=4^{2} \quad 5 b=3^{2} \quad h^{2}=a b$

$$
\begin{array}{ll}
a=3.2 \quad b=1.8 & h^{2}=3.2 \cdot 1.8 \\
& h=\sqrt{5.76}=2.4
\end{array}
$$

REF: 081037ge

16 ANS:

$$
\text { } \begin{aligned}
& \quad \frac{10+x}{12}=\frac{12}{x} \\
& x(10+x)=144 \\
& x^{2}+10 x-144=0 \\
& (x+18)(x-8)=0 \\
& x=8
\end{aligned}
$$

REF: 060828b
17 ANS:

$$
x(x+6)=4^{2}
$$

10. Let $\overline{A D}=x . \quad \begin{aligned} x^{2}+6 x-16 & =0\end{aligned}$. Since $D C=8, A C=10$.

$$
\begin{aligned}
(x+8)(x-2) & =0 \\
x & =2
\end{aligned}
$$

REF: 080932b
18 ANS:
$2 \sqrt{3} \cdot x^{2}=3 \cdot 4$

$$
x=\sqrt{12}=2 \sqrt{3}
$$

REF: fall0829ge
19 ANS:
$4 x \cdot x=6^{2}$

$$
4 x^{2}=36
$$

$$
x^{2}=9
$$

$$
x=3
$$

$$
\overline{B D}=4(3)=12
$$

REF: 011437ge
20 ANS:

REF: 011638ge

$$
\begin{aligned}
& x(x+16)=15^{2} \quad y^{2}=16 \cdot 9 \\
& x^{2}+16 x-225=0 \quad y^{2}=144 \\
& (x+25)(x-9)=0 \quad y=12 \\
& x=9
\end{aligned}
$$

21 ANS:


$$
\begin{array}{rlrl}
x(x+16) & =15^{2} & 25 \cdot 34=y^{2} \\
x^{2}+16 x-225 & =0 & 5 \sqrt{34}=y \\
(x+25)(x-9) & =0 & \\
x & =9 &
\end{array}
$$

REF: 011538ge

