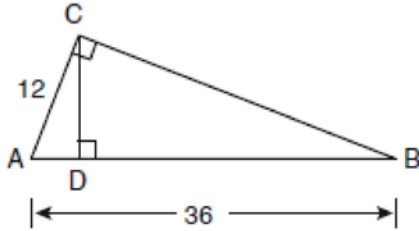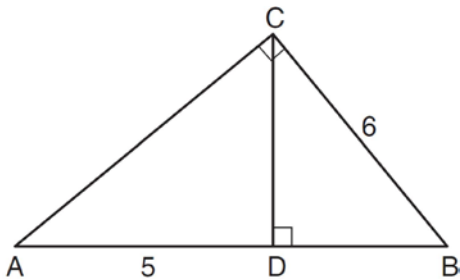Name: _____

G.SRT.B.4: Similarity 2

1 In the diagram below of right triangle ACB, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$.

If $AB = 36$ and $AC = 12$, what is the length of $\overline{AD}$?
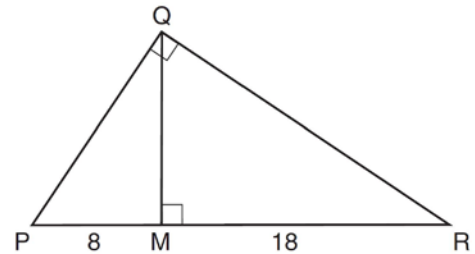1) 32
2) 6
3) 3
4) 4

2 In the diagram below of right triangle ABC, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$, $CB = 6$, and $AD = 5$.

What is the length of $\overline{BD}$?
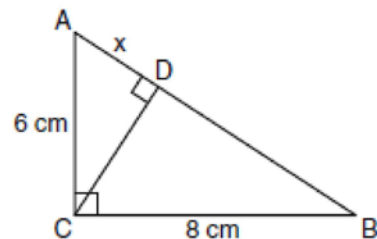1) 5
2) 9
3) 3
4) 4

3 In the diagram below, $\overline{QM}$ is an altitude of right triangle PQR, $PM = 8$, and $RM = 18$.

What is the length of $\overline{QM}$?
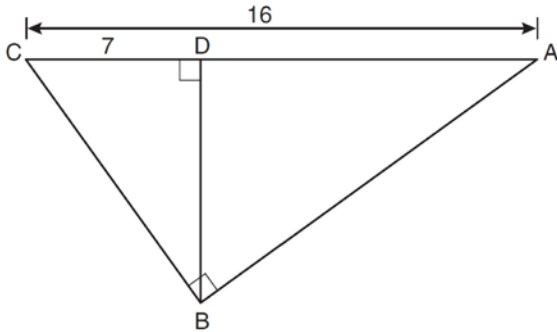1) 20
2) 16
3) 12
4) 10

4 In the diagram below, the length of the legs $\overline{AC}$ and $\overline{BC}$ of right triangle ABC are 6 cm and 8 cm, respectively. Altitude $\overline{CD}$ is drawn to the hypotenuse of $\triangle ABC$.

What is the length of $\overline{AD}$ to the *nearest tenth of a centimeter*?
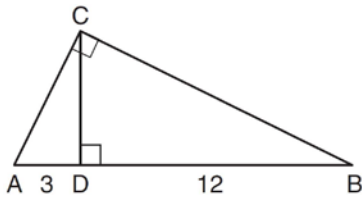1) 3.6
2) 6.0
3) 6.4
4) 4.0

5   In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $AC = 16$, and $CD = 7$.

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

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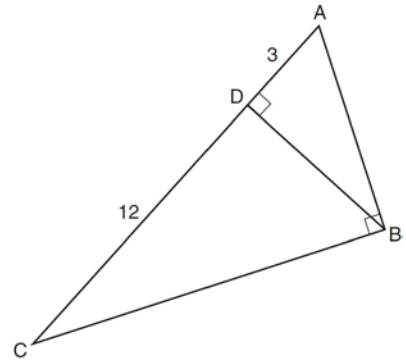2) $4\sqrt{7}$
3) $7\sqrt{3}$
4)   12

6   In the diagram below of right triangle ABC, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$.

If $AD = 3$ and $DB = 12$, what is the length of altitude $\overline{CD}$?

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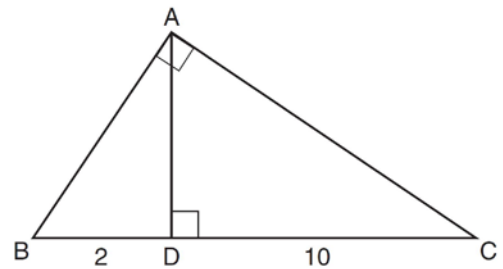2) $6\sqrt{5}$
3)   3
4) $3\sqrt{5}$

7   In right triangle ABC shown in the diagram below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $CD = 12$, and $AD = 3$.

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

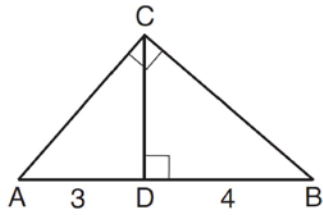1) $5\sqrt{3}$
2)   6
3) $3\sqrt{5}$
4)   9

8   Triangle ABC shown below is a right triangle with altitude $\overline{AD}$ drawn to the hypotenuse $\overline{BC}$.

If $BD = 2$ and $DC = 10$, what is the length of $\overline{AB}$?

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

9 In the diagram below of right triangle ABC, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$, $AD = 3$, and $DB = 4$.

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

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

10 In $\triangle PQR$, $\angle PRQ$ is a right angle and $\overline{RT}$ is drawn perpendicular to hypotenuse $\overline{PQ}$. If $PT = x$, $RT = 6$, and $TQ = 4x$, what is the length of $\overline{PQ}$?

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

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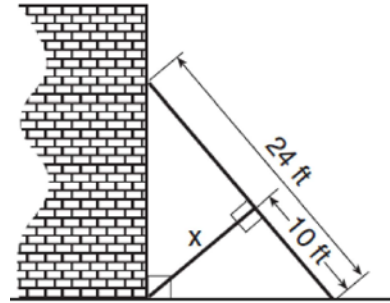
If the steel brace is connected to the ladder at a point that is 10 feet from the foot of the ladder, which equation can be used to find the length, x, of the steel brace?

1) $\dfrac{10}{x} = \dfrac{x}{14}$

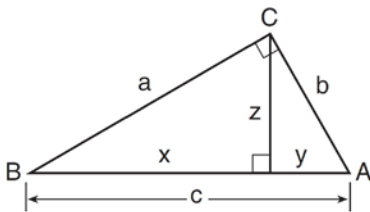2) $\dfrac{10}{x} = \dfrac{x}{24}$

3) $10^2 + x^2 = 14^2$

4) $10^2 + x^2 = 24^2$

12 The accompanying diagram shows part of the architectural plans for a structural support of a building. $PLAN$ is a rectangle and $\overline{AS} \perp \overline{LN}$.
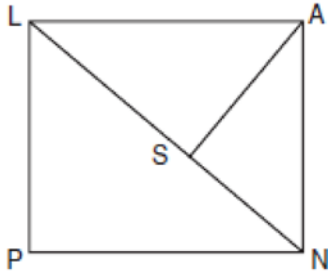
Which equation can be used to find the length of $\overline{AS}$?

1) $\dfrac{LS}{AS} = \dfrac{AS}{SN}$

2) $\dfrac{AN}{LN} = \dfrac{AS}{LS}$

3) $\dfrac{AS}{SN} = \dfrac{AS}{LS}$

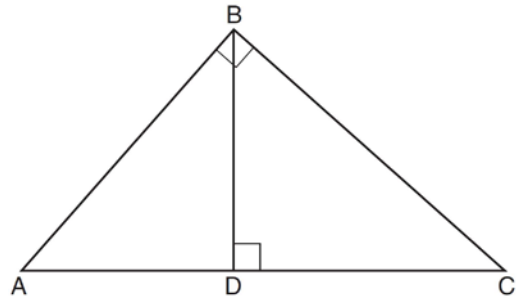4) $\dfrac{AS}{LS} = \dfrac{LS}{SN}$

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

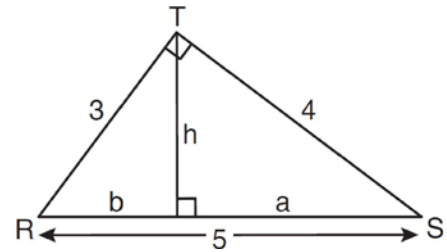Which proportion would always represent a correct relationship of the segments?

1) $\dfrac{c}{z} = \dfrac{z}{y}$

2) $\dfrac{c}{a} = \dfrac{a}{y}$

3) $\dfrac{x}{z} = \dfrac{z}{y}$

4) $\dfrac{y}{b} = \dfrac{b}{x}$

14 In right triangle ABC shown below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.

If $AD = 8$ and $DC = 10$, determine and state the length of $\overline{AB}$.

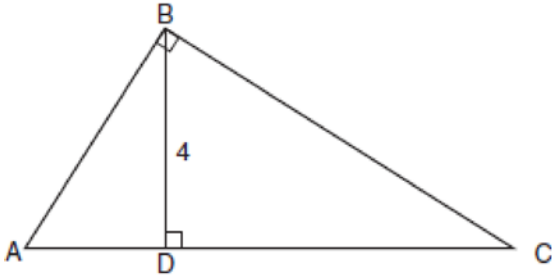15 In the diagram below, $\triangle RST$ is a $3 - 4 - 5$ right triangle. The altitude, h, to the hypotenuse has been drawn. Determine the length of h.

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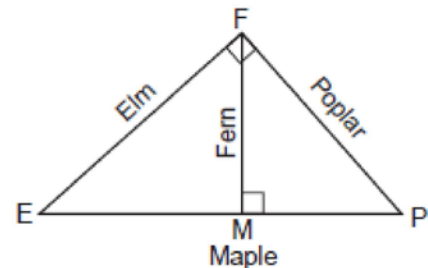
17 The drawing for a right triangular roof truss, represented by $\triangle ABC$, is shown in the accompanying diagram. If $\angle ABC$ is a right angle, altitude $BD = 4$ meters, and $\overline{DC}$ is 6 meters longer than $\overline{AD}$, find the length of base $\overline{AC}$ in meters.
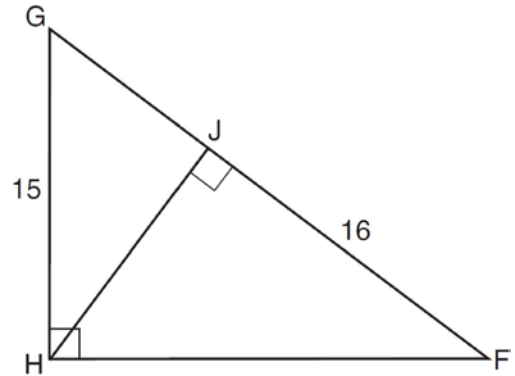

18 In the diagram below of right triangle ACB, altitude $\overline{CD}$ intersects $\overline{AB}$ at D. If $AD = 3$ and $DB = 4$, find the length of $\overline{CD}$ in simplest radical form.
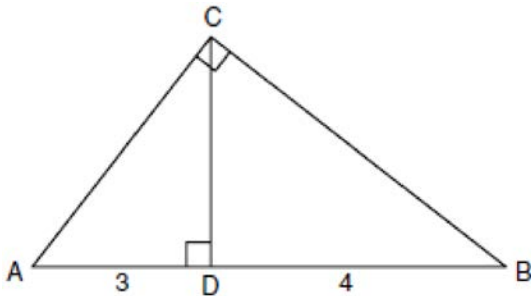
19 In right triangle ABC below, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$. If $CD = 6$ and the ratio of AD to AB is 1:5, determine and state the length of $\overline{BD}$. [Only an algebraic solution can receive full credit.]
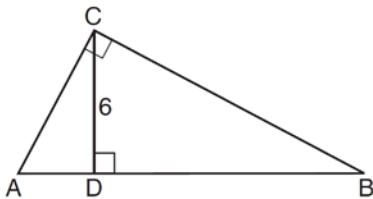

20 In right triangle FGH shown below, $m\angle GHF = 90$, altitude $\overline{HJ}$ is drawn to $\overline{FG}$, $FJ = 16$, and $HG = 15$.

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

21 In the diagram below, right triangle RSU is inscribed in circle O, and $\overline{UT}$ is the altitude drawn to hypotenuse $\overline{RS}$. The length of $\overline{RT}$ is 16 more than the length of $\overline{TS}$ and $TU = 15$. Find the length of $\overline{TS}$. Find, in simplest radical form, the length of $\overline{RU}$.
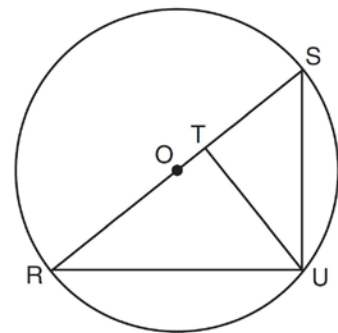
G.SRT.B.4: Similarity 2
Answer Section

1 ANS: 4
Let $\overline{AD} = x$. $36x = 12^2$
$$x = 4$$

REF: 080922ge
2 ANS: 4
$6^2 = x(x + 5)$

$36 = x^2 + 5x$

$0 = x^2 + 5x - 36$

$0 = (x + 9)(x - 4)$

$x = 4$

REF: 011123ge
3 ANS: 3
$x^2 = 8 \times 18$

$x^2 = 144$

$x = 12$

REF: 061506ge
4 ANS: 1
$\overline{AB} = 10$ since $\triangle ABC$ is a 6-8-10 triangle. $6^2 = 10x$
$$3.6 = x$$

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

$x^2 = 3 \times 12.$ $\sqrt{6^2 + 3^2} = \sqrt{45} = \sqrt{9}\sqrt{5} = 3\sqrt{5}$

$x = 6$

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

$x^2 = 4 \cdot 7$

$x = \sqrt{4} \cdot \sqrt{7}$

$x = 2\sqrt{7}$

REF: 081528ge

10 ANS: 4

$x \cdot 4x = 6^2.$ $PQ = 4x + x = 5x = 5(3) = 15$

$4x^2 = 36$

$x = 3$

REF: 011227ge

11 ANS: 1   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. $5a = 4^2$ $5b = 3^2$ $h^2 = ab$

$a = 3.2$ $b = 1.8$ $h^2 = 3.2 \cdot 1.8$

$h = \sqrt{5.76} = 2.4$

REF: 081037ge

2

16 ANS:

$$\frac{10 + x}{12} = \frac{12}{x}$$

$x(10 + x) = 144$

8. $x^2 + 10x - 144 = 0$

$(x + 18)(x - 8) = 0$

$x = 8$

REF: 060828b

17 ANS:

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

10. Let $\overline{AD} = x$. $\begin{array}{c} x^2 + 6x - 16 = 0 \\ (x + 8)(x - 2) = 0 \end{array}$. Since $DC = 8$, $AC = 10$.

$$x = 2$$

REF: 080932b

18 ANS:

$2\sqrt{3}$. $x^2 = 3 \cdot 4$

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

REF: fall0829ge

19 ANS:

$4x \cdot x = 6^2$

$4x^2 = 36$

$x^2 = 9$

$x = 3$

$\overline{BD} = 4(3) = 12$

REF: 011437ge
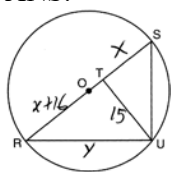
20 ANS:

$x(x + 16) = 15^2 \quad y^2 = 16 \cdot 9$

$x^2 + 16x - 225 = 0 \quad y^2 = 144$

$(x + 25)(x - 9) = 0 \quad y = 12$

$x = 9$

REF: 011638ge

3

21 ANS:

$$x(x + 16) = 15^2 \quad 25 \cdot 34 = y^2$$
$$x^2 + 16x - 225 = 0 \quad 5\sqrt{34} = y$$
$$(x + 25)(x - 9) = 0$$
$$x = 9$$

REF: 011538ge