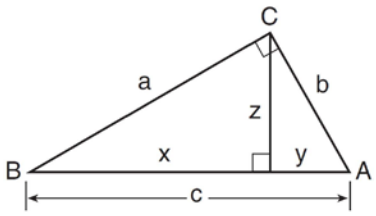
G.SRT.B.5: Similarity 4

1 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?

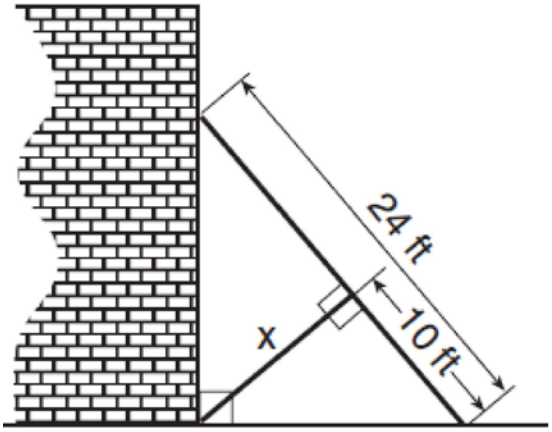
1) $\frac{c}{z} = \frac{z}{y}$

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

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

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

2 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) $\frac{10}{x} = \frac{x}{14}$

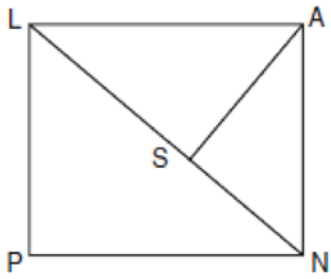
2) $\frac{10}{x} = \frac{x}{24}$

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

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

Name: _____

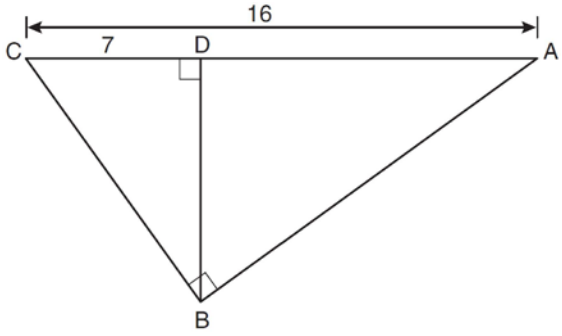
3 The accompanying diagram shows part of the architectural plans for a structural support of a building. $PLAN$ is a rectangle and $\overline{AS} \perp \overline{LN}$.



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

1) $\frac{LS}{AS} = \frac{AS}{SN}$
2) $\frac{AN}{LN} = \frac{AS}{LS}$
3) $\frac{AS}{SN} = \frac{AS}{LS}$
4) $\frac{AS}{LS} = \frac{LS}{SN}$

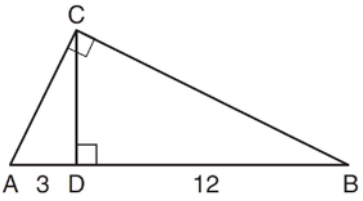
4 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $AC = 16$, and $CD = 7$.



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

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

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

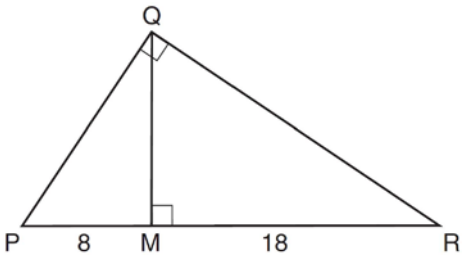


If $AD = 3$ and $DB = 12$, what is the length of altitude $\overline{CD}$?

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

Name: _____

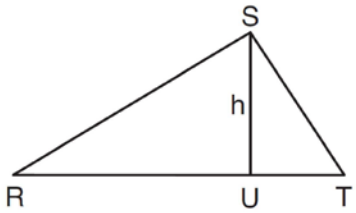
6 In the diagram below, $\overline{QM}$ is an altitude of right triangle PQR, $PM = 8$, and $RM = 18$.



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

1) 20
2) 16
3) 12
4) 10

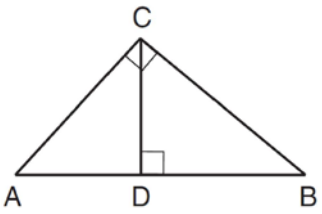
7 In $\triangle RST$ shown below, altitude $\overline{SU}$ is drawn to $\overline{RT}$ at U.



If $SU = h$, $UT = 12$, and $RT = 42$, which value of h will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?

1) $6\sqrt{3}$
2) $6\sqrt{10}$
3) $6\sqrt{14}$
4) $6\sqrt{35}$

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



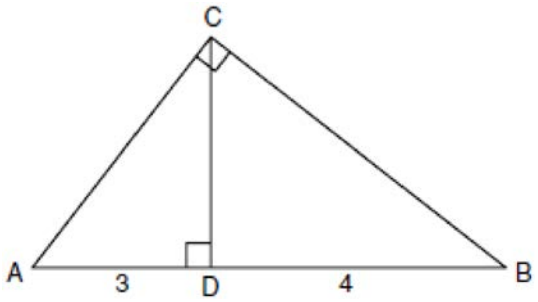
Which lengths would *not* produce an altitude that measures $6\sqrt{2}$?

1) $AD = 2$ and $DB = 36$
2) $AD = 3$ and $AB = 24$
3) $AD = 6$ and $DB = 12$
4) $AD = 8$ and $AB = 17$

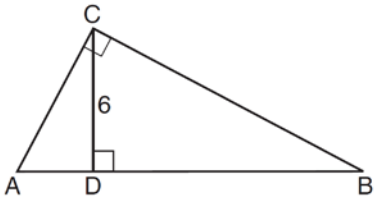
9 In $\triangle PQR$, $\angle PRQ$ is a right angle and $\overline{RT}$ is drawn perpendicular to hypotenuse $\overline{PQ}$. If $PT = x$, $RT = 6$, and $TQ = 4x$, what is the length of $\overline{PQ}$?

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

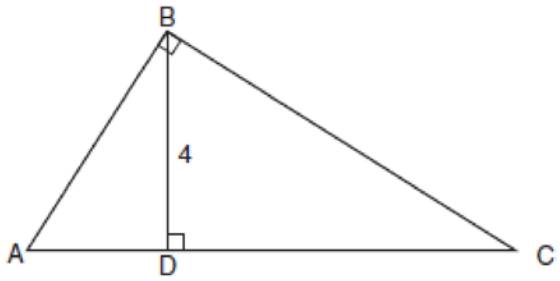
10 In the diagram below of right triangle ACB, altitude $\overline{CD}$ intersects $\overline{AB}$ at D. If $AD = 3$ and $DB = 4$, find the length of $\overline{CD}$ in simplest radical form.



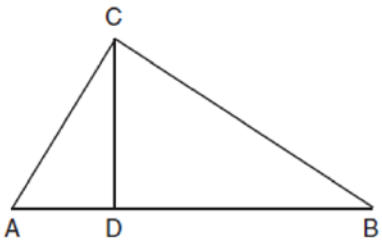
11 In right triangle ABC below, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$. If $CD = 6$ and the ratio of AD to AB is 1:5, determine and state the length of $\overline{BD}$. [Only an algebraic solution can receive full credit.]



12 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.



13 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.



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Answer Section

1 ANS: 3 REF: 081410ge
2 ANS: 1 REF: 010619b
3 ANS: 1 REF: 010920b
4 ANS: 1

$x^2 = 7(16-7)$

$x^2 = 63$

$x = \sqrt{9}\sqrt{7}$

$x = 3\sqrt{7}$

REF: 061128ge
5 ANS: 1

$x^2 = 3 \times 12$

$x = 6$

REF: 011308ge
6 ANS: 3

$x^2 = 8 \times 18$

$x^2 = 144$

$x = 12$

REF: 061506ge
7 ANS: 2

$h^2 = 30 \cdot 12$

$h^2 = 360$

$h = 6\sqrt{10}$

REF: 061613geo
8 ANS: 2

$\sqrt{3 \cdot 21} = \sqrt{63} = 3\sqrt{7}$

REF: 011622geo
9 ANS: 4

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

$4x^2 = 36$

$x = 3$

REF: 011227ge

10 ANS:

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

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

REF: fall0829ge

11 ANS:

$4x \cdot x = 6^2$

$4x^2 = 36$

$x^2 = 9$

$x = 3$

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

REF: 011437ge

12 ANS:

10. Let $\overline{AD} = x$. $\begin{aligned} x(x+6) &= 4^2 \\ x^2 + 6x - 16 &= 0 \\ (x+8)(x-2) &= 0 \\ x &= 2 \end{aligned}$. Since $DC = 8,\ AC = 10$.

REF: 080932b

13 ANS:

If an altitude is drawn to the hypotenuse of a triangle, it divides the triangle into two right triangles similar to each other and the original triangle.

REF: 061729geo