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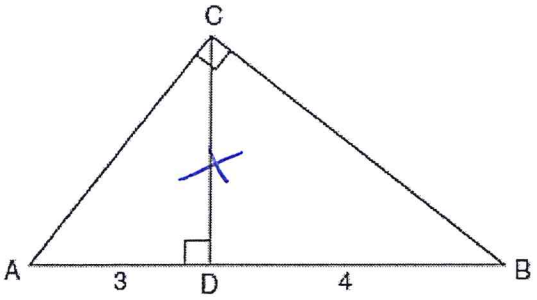
Date _____
Geometry

Altitude Drawn to a Right Triangle with Radicals

1. 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.



$\frac{S}{A} = \frac{A}{S}$ $\quad x = 2\sqrt{3}$

$\frac{3}{x} = \frac{x}{4}$

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

$x = \sqrt{12}$

$\sqrt{12}$
$\sqrt{4}\sqrt{3}$
$2\sqrt{3}$

2. 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 $\overline{AB}$?

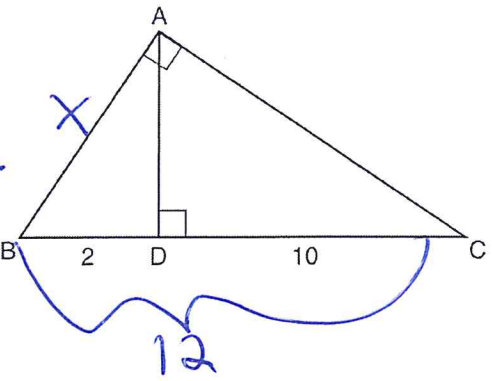
1) $2\sqrt{2}$
2) $2\sqrt{5}$
3) $2\sqrt{6}$
4) $2\sqrt{30}$

$\frac{H}{L} = \frac{L}{S}$ $\quad \sqrt{x^2} = \sqrt{24}$

$\frac{12}{x} = \frac{x}{2}$ $\quad x = \sqrt{24}$

$x = 2\sqrt{6}$

$\sqrt{24}$
$\sqrt{4}\sqrt{6}$
$2\sqrt{6}$



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

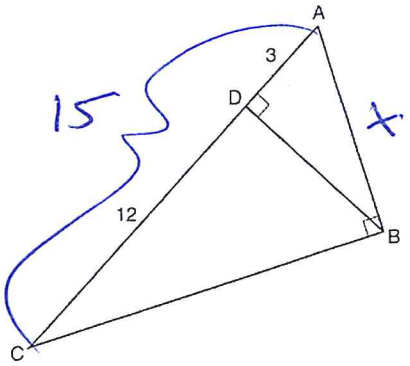
What is the length of $\overline{AB}$?

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

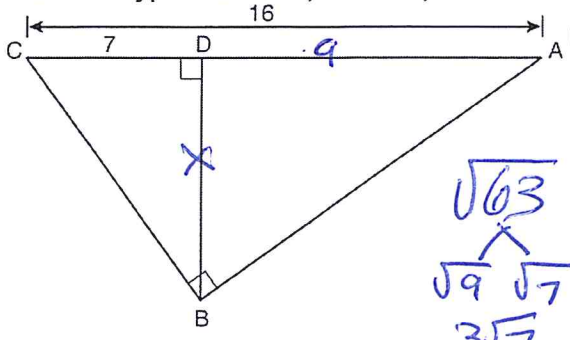
$\frac{H}{L} = \frac{L}{S}$ $\quad \frac{15}{x} = \frac{x}{3}$

$\sqrt{x^2} = \sqrt{45}$

$\sqrt{9}\sqrt{5}$
$3\sqrt{5}$



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

$\frac{S}{A} = \frac{A}{S}$

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

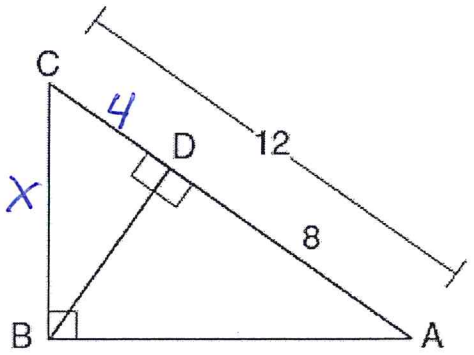
$\sqrt{x^2} = \sqrt{63}$

$\sqrt{63}$

$\sqrt{9}\ \sqrt{7}$

$3\sqrt{7}$

5. In the diagram below of $\triangle ABC$, $\angle ABC$ is a right angle, $AC = 12$, $AD = 8$, and altitude $\overline{BD}$ is drawn.



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

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

$\frac{H}{L} = \frac{L}{S}$

$\frac{12}{x} = \frac{x}{4}$

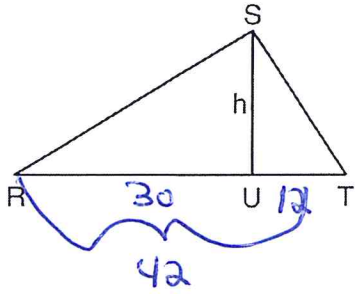
$\sqrt{x^2} = \sqrt{48}$

$\sqrt{16}\ \sqrt{3}$

$x = 4\sqrt{3}$

6. 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) $6\sqrt{35}$



$\frac{S}{A} = \frac{A}{S}$

$\frac{30}{h} = \frac{h}{12}$

$\sqrt{h^2} = \sqrt{360}$

$\sqrt{36}\ \sqrt{10}$

$6\sqrt{10}$

7. In the diagram of right triangle ABC, $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at D.
If $AD = 4$ and $DB = 6$, which length of $\overline{AC}$ makes $\overline{CD} \perp \overline{AB}$?

1) $2\sqrt{6}$
2) $2\sqrt{10}$
3) $2\sqrt{15}$
4) $4\sqrt{2}$

$\frac{H}{L} = \frac{L}{S}$

$\frac{10}{x} = \frac{x}{4}$

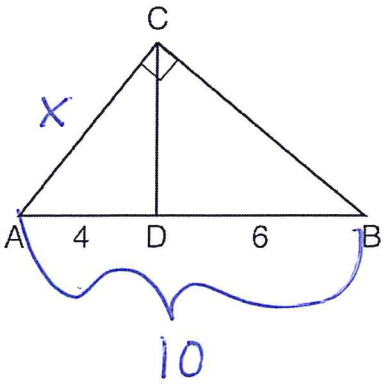
$\sqrt{x^2} = \sqrt{40}$

$x = 2\sqrt{10}$

$\sqrt{40}$

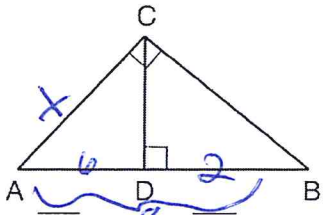
$\sqrt{4}\ \sqrt{10}$

$2\sqrt{10}$



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

$\frac{8}{2} = \frac{6}{6}$



If $\overline{AB} = 8$ and $\overline{DB} = 2$, find $\overline{AC}$ in simplest radical form

$\frac{H}{L} = \frac{L}{S}$

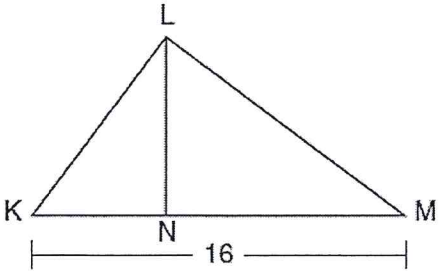
$\frac{8}{x} = \frac{x}{6}$

$\sqrt{x^2} = \sqrt{48}$

$\sqrt{16}\ \sqrt{3}$

$4\sqrt{3}$

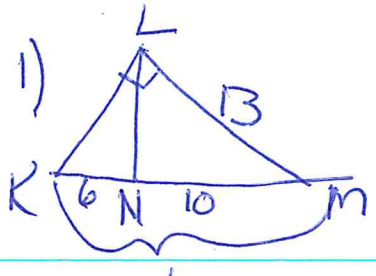
9. Kirstie is testing values that would make triangle KLM a right triangle when $\overline{LN}$ is an altitude, and $KM = 16$, as shown below.



Which lengths would make triangle KLM a right triangle?

1) $LM = 13$ and $KN = 6$
2) $LM = 12$ and $NM = 9$
3) $KL = 11$ and $KN = 7$
4) $LN = 8$ and $NM = 10$

1)

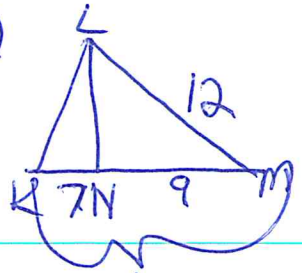


16

$\frac{H}{L} = \frac{L}{S}$ $\frac{16}{13} = \frac{13}{10}$

$160 = 169$ X

2)



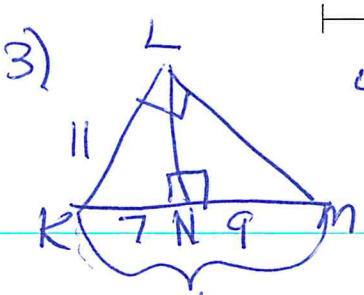
16

$\frac{H}{L} = \frac{L}{S}$

$\frac{16}{12} = \frac{12}{9}$

$144 = 144$ ✓

3)



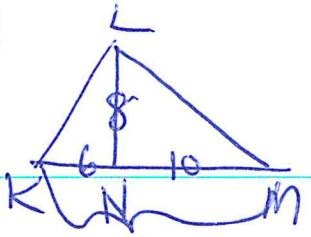
16

$\frac{H}{L} = \frac{L}{S}$ $\frac{16}{11} = \frac{11}{7}$

$112 = 121$

X

4)



16

$\frac{S}{A} = \frac{A}{S}$ $\frac{6}{8} = \frac{8}{10}$

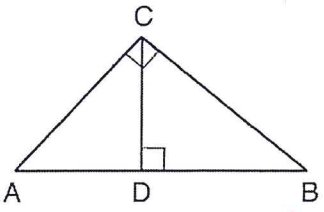
$60 = 64$

X

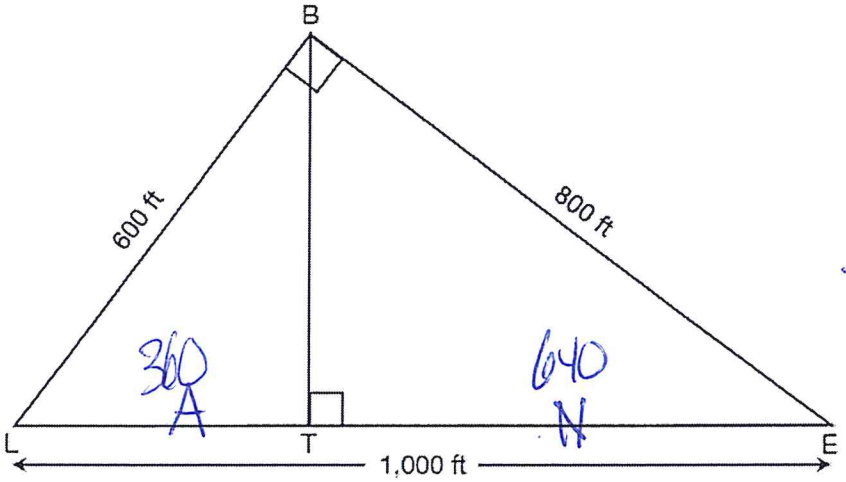
10. In the diagrm below, $\overline{CD}$ is the altitude drawn to the hypotenuse $\overline{AB}$ of right triangle ABC.

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 $AB = 17$



11. At the Hillside Zoo, the distance from the lion exhibit, L, to the bird aviary, B, is 600 feet. The distance from the bird aviary to the elephant compound, E, is 800 feet. The distance from the lion exhibit to the elephant compound is 1,000 feet.



Albert is currently at the lion exhibit and Nikki is currently at the elephant compound. They plan to meet at the tiger preserve, T. How much further, in feet, is Nikki's walk from the elephant compound to the tiger preserve than Albert's walk from the lion exhibit to the tiger preserve, if they both take the shortest route possible?