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CC GEOMETRY

Date: 1/31/18
TROICI

**LESSON #4: PRACTICE WITH RADICALS + HLLS/SAAS**

1. List all of your perfect squares less than **200**.

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196

2. Simplify each of the following radicals:

a) $5\sqrt{80}$

$5\sqrt{16}\sqrt{5}$

$5 \cdot 4\sqrt{5}$

$\boxed{20\sqrt{5}}$

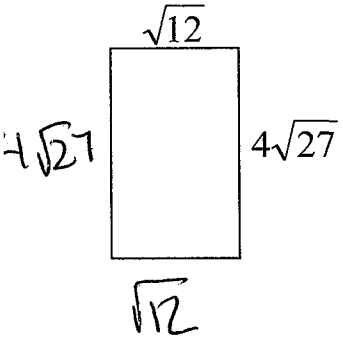
b) $2\sqrt{27x^{10}}$

$2\sqrt{9}\sqrt{3}\sqrt{x^{10}}$

$2 \cdot 3 \cdot \sqrt{3} \cdot x^5$

$\boxed{6x^5\sqrt{3}}$

3. Find the area and perimeter of the following rectangle:




Area: L x W

$\sqrt{12} \cdot 4\sqrt{27}$

$4\sqrt{324}$

$4 \cdot 18$

$\boxed{72}$

Perimeter: Add all sides

$\sqrt{12} + \sqrt{12} + 4\sqrt{27} + 4\sqrt{27}$

$\sqrt{4}\sqrt{3}$ $\quad$ $4\sqrt{9}\sqrt{3}$

$4 \cdot 3\sqrt{3}$

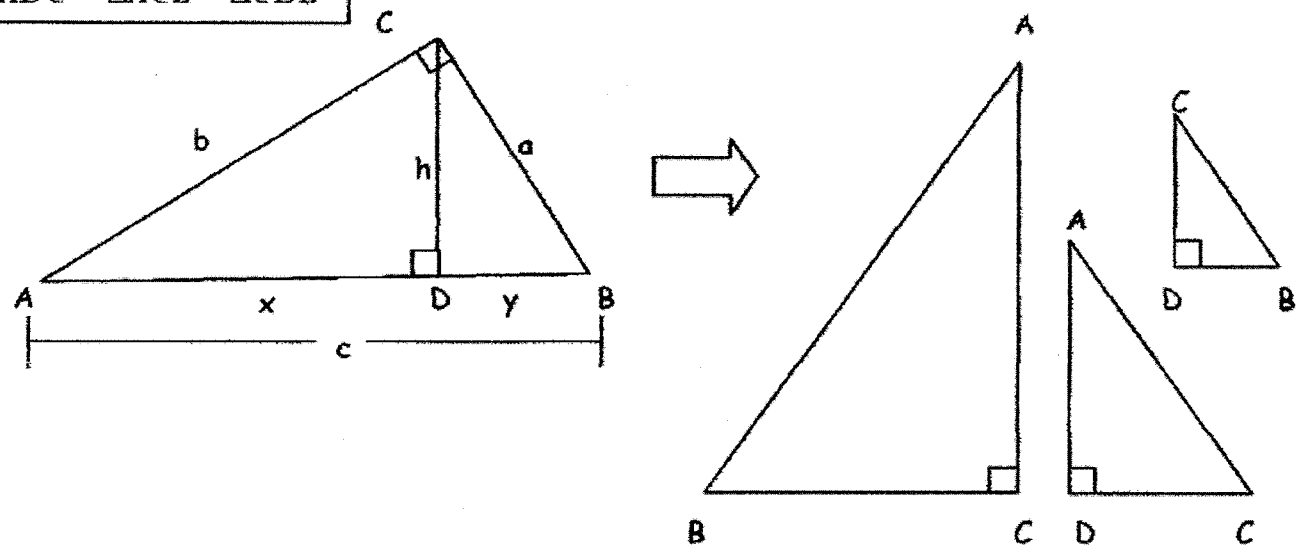
$2\sqrt{3} + 2\sqrt{3} + 12\sqrt{3} + 12\sqrt{3}$

$\boxed{28\sqrt{3}}$

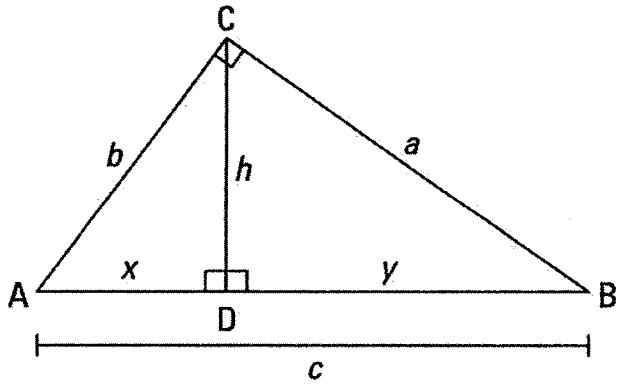
**THM:** If an altitude is drawn to the hypotenuse of a right triangle, then...

a. The two triangles formed are similar to the given right triangle and to each other.

$\Delta ADC \sim \Delta ACB \sim \Delta CDB$

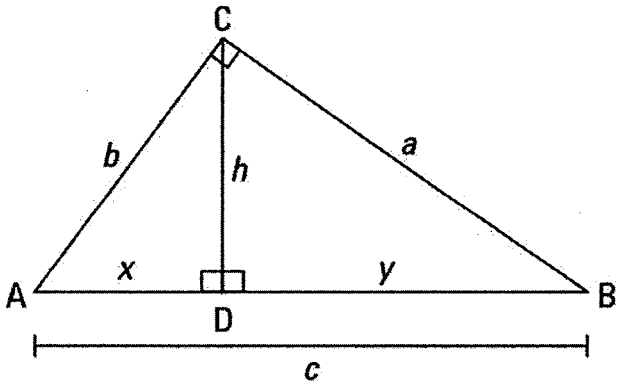



**HLLS**




$\frac{c}{b} = \frac{b}{x}$ or $\frac{c}{a} = \frac{a}{y}$

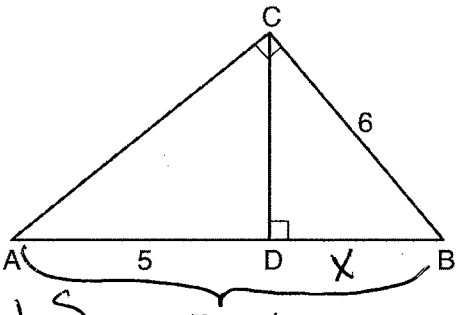
**SAAS**




$\frac{x}{h} = \frac{h}{y}$

***MIXED PRACTICE WITH RIGHT TRIANGLES AND THEIR SUB-TRIANGLES!***

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




HLLS $5+X$

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

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

$\frac{5+X}{6} = \frac{6}{X}$

$X(5+X) = 36$

$5X + X^2 = 36$

$-36 \quad -36$

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

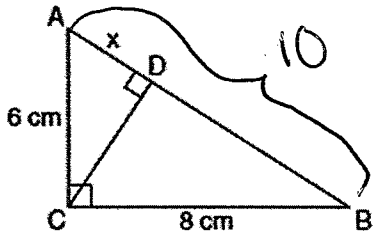
$(X+9)(X-4) = 0$

$-9 \quad | \quad 4$

reject!

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

2. 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

① Find hypotenuse using: $a^2+b^2=c^2$

$6^2+8^2=c^2$

$100=c^2$

$c=10$

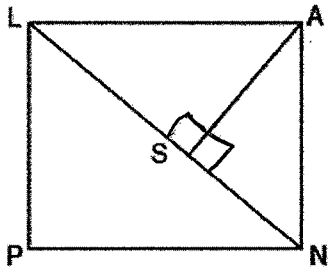
② HLLS:

$\frac{10}{6} = \frac{6}{X}$

$10X = 36$

$X = 3.6$

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 $\overline{AS}$?

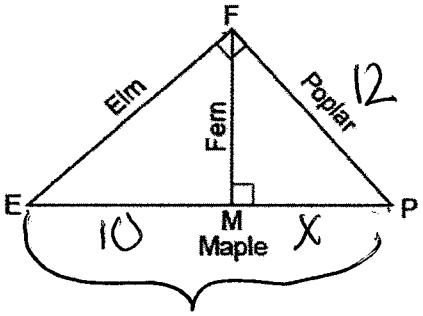
1) $\frac{LS}{AS} = \frac{AS}{SN}$ → SAS must be diagonal!

2) ~~$\frac{AN}{LN} = \frac{AS}{LS}$~~

3) ~~$\frac{AS}{SN} = \frac{AS}{LS}$~~

4) ~~$\frac{AS}{LS} = \frac{LS}{SN}$~~

4. 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*.




HLLS!

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

$x(x+10) = 144$

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

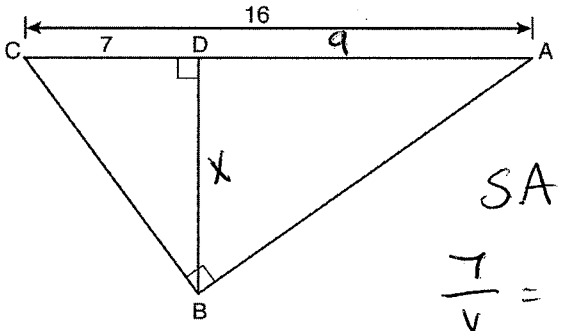
$(x+18)(x-8) = 0$

$-18$ | 8

reject!

IMP = 6

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




SAAS

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

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

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

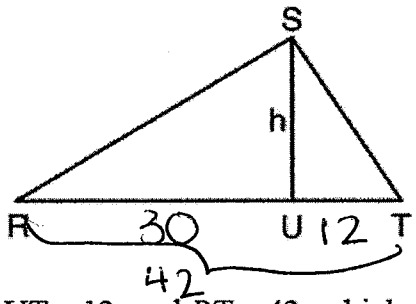
$3\sqrt{7} = X$

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

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

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) $6\sqrt{35}$

SAAS!

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

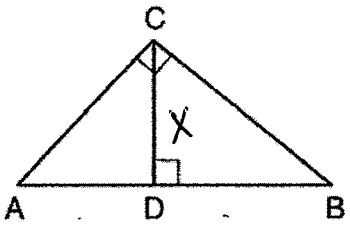
$\sqrt{h^2} = \sqrt{360}$

$h = \sqrt{36}\sqrt{10}$

$h = 6\sqrt{10}$

7.

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




SAAS!

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

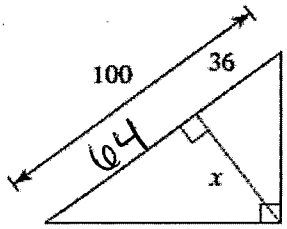
1) $AD = 2$ and $DB = 36$ $\frac{2}{6\sqrt{2}} = \frac{6\sqrt{2}}{36}$ ✓
2) $AD = 3$ and $AB = 24$ $\frac{3}{6\sqrt{2}} = \frac{6\sqrt{2}}{24}$ ✓
3) $AD = 6$ and $DB = 12$ ✓
4) $AD = 8$ and $AB = 17$

$\frac{8}{6\sqrt{2}} = \frac{6\sqrt{2}}{17}$

$136 \neq 72$ !

For each of the following, find the missing lengths.

1)



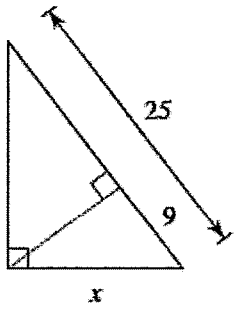

SAAS

$\frac{36}{x} = \frac{x}{64}$

$2304 = x^2$

$x = 48$

2)



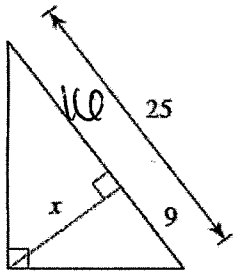

HLLS

$\frac{25}{x} = \frac{x}{9}$

$\sqrt{225} = \sqrt{x^2}$

$x = 15$

3)



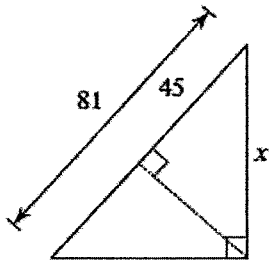

SAAS

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

$\sqrt{x^2} = \sqrt{144}$

$x = 12$

4)




HLLS

$\frac{81}{x} = \frac{x}{45}$

$\sqrt{3645} = \sqrt{x^2}$

$\sqrt{729}\ \sqrt{5}$

$27\sqrt{5} = x$