

Name: Key

Date: 1/30/18

CC GEOMETRY

TROICI

LESSON #3: HLLS & SAAS

Do Now:

1. If a rectangle has a length of $2\sqrt{12x^3}$ and a width of $\sqrt{27x^3}$:

a. What is the area?

$$A = 2\sqrt{12x^3} \cdot \sqrt{27x^3}$$

$$A = 2\sqrt{324x^6}$$

$$A = 2 \cdot 18 \cdot x^3 = \boxed{36x^3}$$

b. What is the perimeter?

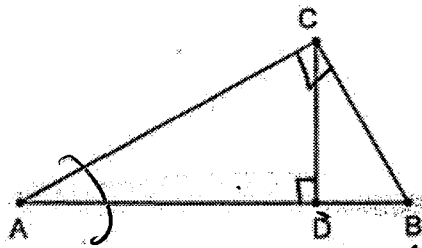
$$2\sqrt{12x^3} + 2\sqrt{12x^3} + \sqrt{27x^3} + \sqrt{27x^3}$$

$$2 \cdot \sqrt{4} \sqrt{3} \sqrt{x^2} \sqrt{x} + \sqrt{9} \sqrt{3} \sqrt{x^2} \sqrt{x}$$

$$4x\sqrt{3x} + 4x\sqrt{3x} + 3x\sqrt{3x} + 3x\sqrt{3x}$$

$$\boxed{14x\sqrt{3x}}$$

$\angle ACB$ is a right angle. CD is an altitude



Name a pair of similar triangles within the triangle below:

$$\triangle ACB \sim \triangle ADC$$

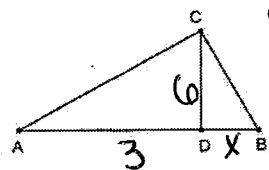
by AA \cong AA similarity

Therefore, we can set up the following proportions:

HLLS	SAAS
$\frac{\text{Hypotenuse}}{\text{leg}} = \frac{\text{leg}}{\text{side}}$	$\frac{\text{side}_1}{\text{alt}} = \frac{\text{alt}}{\text{side}_2}$

Right Triangle ABC with altitude \overline{CD} :

1. If $AD = 3$, $CD = 6$, find DB



alt. labels = SAAS

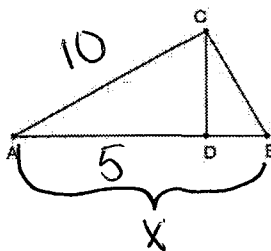
$$\frac{3}{6} = \frac{6}{x}$$

$$36 = 3x$$

$$\boxed{x = 12}$$

$$\boxed{DB = 12}$$

2. If $AC = 10$, $AD = 5$, find AB .



HLLS!

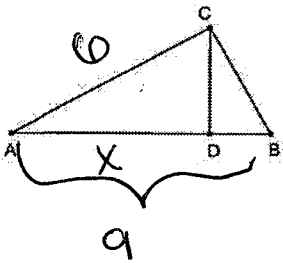
$$\frac{x}{10} = \frac{10}{5}$$

$$100 = 5x$$

$$x = 20$$

$$\boxed{AB = 20}$$

3. If AC = 6, AB = 9, find AD.



HLLS!

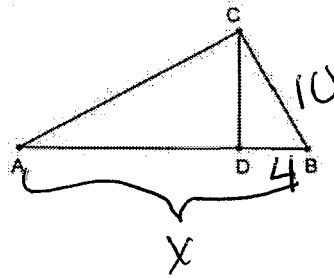
$$\frac{9}{6} = \frac{6}{x}$$

$$9x = 36$$

$$x = 4$$

AD = 4

4. If DB = 4, BC = 10, find AB.



HLLS!

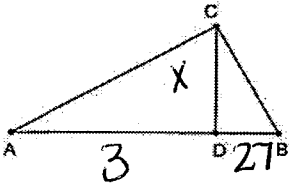
$$\frac{x}{10} = \frac{10}{4}$$

$$100 = 4x$$

$$x = 25$$

AB = 25

5. If AD = 3, DB = 27, find CD.



SAAS!

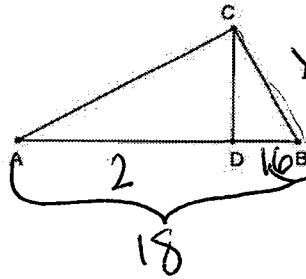
$$\frac{3}{x} = \frac{x}{27}$$

$$\sqrt{81} = \sqrt{x^2}$$

$$x = 9$$

CD = 9

6. If AD = 2, AB = 18, find BC.



HLLS!

need this side!

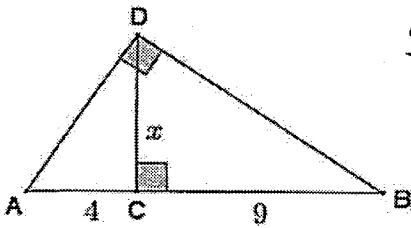
$$\frac{18}{x} = \frac{x}{16}$$

$$\sqrt{x^2} = \sqrt{288}$$

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

CB = 12√2

7. Solve for x.



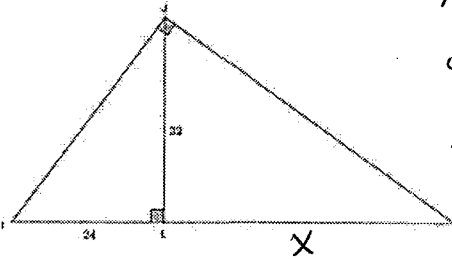
SAAS!

$$\frac{4}{x} = \frac{x}{9}$$

$$\sqrt{x^2} = \sqrt{36}$$

x = 6

8. Find the length of LM.



SAAS

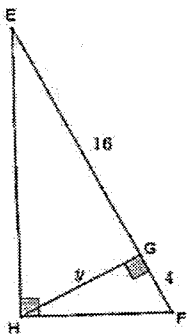
$$\frac{24}{32} = \frac{32}{x}$$

$$24x = 1024$$

x = 42.7

LM = 42.7

9. Solve for y.



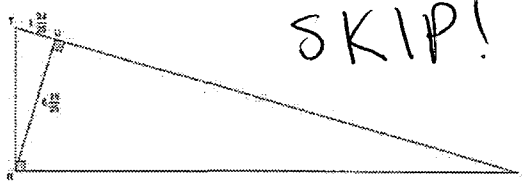
SAAS!

$$\frac{4}{y} = \frac{y}{16}$$

$$\sqrt{64} = \sqrt{y^2}$$

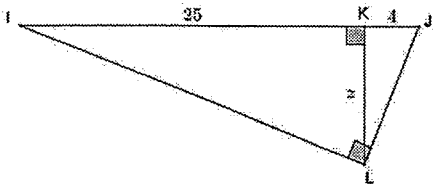
y = 8

10. Find the length of SU.



SKIP!

11. Solve for z.



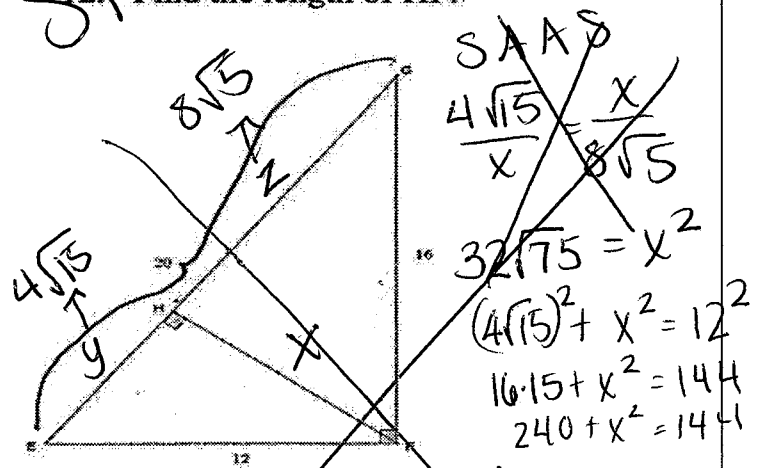
$$\frac{25}{z} = \frac{z}{4}$$

$$\sqrt{z^2} = \sqrt{100}$$

$$\boxed{z=10}$$

~~SKIP~~

12. Find the length of HF.



~~SAAS~~

$$\frac{4\sqrt{5}}{x} = \frac{x}{8\sqrt{5}}$$

$$32\sqrt{5} = x^2$$

$$(4\sqrt{5})^2 + x^2 = 12^2$$

$$16 \cdot 5 + x^2 = 144$$

$$240 + x^2 = 144$$

Need: HLLS first!

$$\frac{20}{y} = \frac{y}{12}$$

$$\frac{20}{z} = \frac{z}{16}$$

$$\sqrt{y^2} = \sqrt{240}$$

$$y = \sqrt{160}\sqrt{3}$$

$$y = 4\sqrt{15}$$

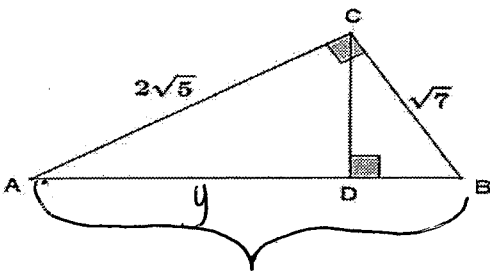
$$\sqrt{z^2} = \sqrt{320}$$

$$z = \sqrt{64}\sqrt{5}$$

$$z = 8\sqrt{5}$$

13. Find AB and AD.

x y



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

HLLS!

$$(2\sqrt{5})^2 + (\sqrt{7})^2 = x^2$$

$$4(5) + 7 = x^2$$

$$20 + 7 = x^2$$

$$\sqrt{27} = \sqrt{x^2}$$

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

$$\boxed{AB = 3\sqrt{3}}$$

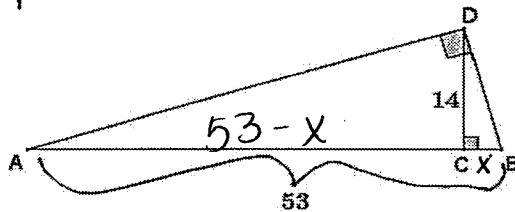
$$\frac{3\sqrt{3}}{2\sqrt{5}} = \frac{2\sqrt{5}}{y}$$

$$\frac{3\sqrt{3}y}{3\sqrt{3}} = \frac{20}{3\sqrt{3}}$$

$$y = \frac{20}{3\sqrt{3}}$$

$$\boxed{AD = \frac{20}{3\sqrt{3}}}$$

14. Find the length of CB.



SAAS!

$$\frac{53-x}{14} = \frac{14}{x}$$

$$\boxed{CB = 49 \text{ or } 4}$$

$$x(53-x) = 196$$

$$53x - x^2 = 196$$

$$-53x + x^2 + 196 = 0$$

$$x^2 - 53x + 196 = 0$$

$$(x-49)(x-4) = 0$$

$$\boxed{x=49}$$

$$\boxed{x=4}$$

check:

$$\frac{53-49}{14} = \frac{4}{49} \checkmark$$

check:

$$\frac{53-4}{14} = \frac{4}{4} \checkmark$$

