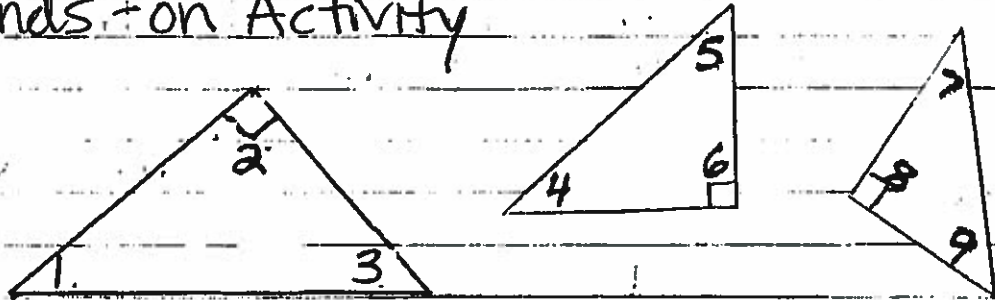


Day 50

7-4: Similarity in Right Triangles

Hands-on Activity

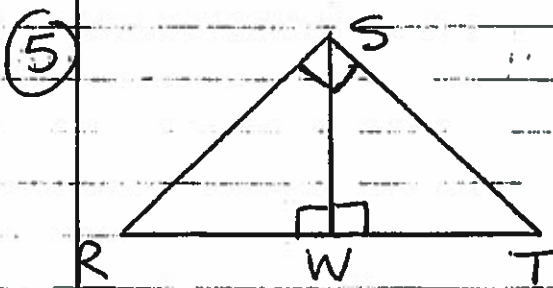


① Which \angle 's have the same measure as $\angle 1$? $\angle 4$ & $\angle 7$

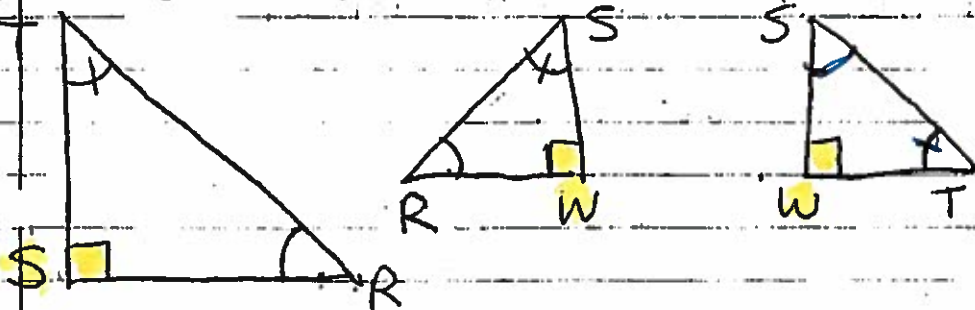
② as $\angle 2$? $\angle 6$ and $\angle 8$

③ as $\angle 3$? $\angle 9$ and $\angle 5$

④ Based on your results, what is true about the 3 Δ 's? they are all similar

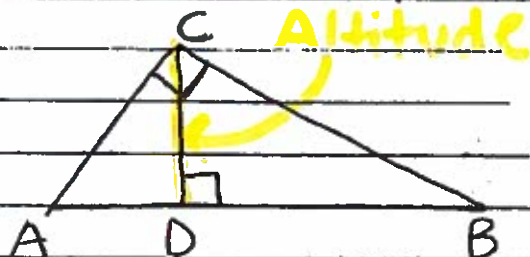


$$\Delta RST \sim \Delta RWS \sim \Delta SWT$$



P. 407-409 (8, 9, 14-23)

The altitude to the hypotenuse of a right Δ divides the Δ into 2 Δ 's that are \sphericalangle to the original Δ and to each other.



$\Delta ABC \sim \Delta ACD \sim \Delta CBD$

Proportions in which the means are equal occur frequently in geometry

$$\frac{a}{b} = \frac{c}{d}$$

($b+c$ are the means)

For any 2 positive numbers a and b , the geometric mean of a and b is



so $\sqrt{x^2} = \sqrt{ab}$
 $x = \sqrt{a \cdot b}$

(ex) Find the geometric mean of 3 and 12.

$$\frac{3}{x} = \frac{x}{12}$$
$$\sqrt{x^2} = \sqrt{36}$$
$$x = 6$$

(ex) Find the geometric mean $\sqrt{6}$ and $\sqrt{12}$.

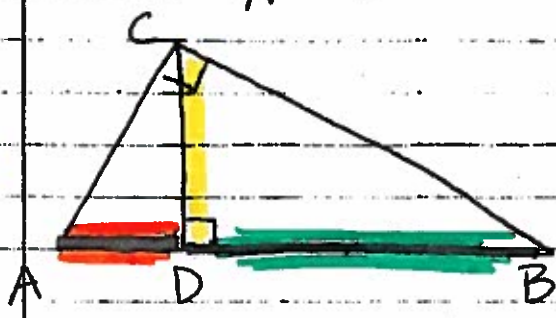
$$\frac{\sqrt{6}}{x} = \frac{x}{\sqrt{12}}$$
$$\sqrt{x^2} = \sqrt{72}$$
$$x = \sqrt{36 \cdot 2}$$

$x = 6\sqrt{2}$

(ex) Find geometric mean of $\frac{1}{9}$ and 28

$x = \sqrt{\frac{1}{9} \cdot 28}$
 $x = \sqrt{\frac{28}{9}}$
 $x = \frac{\sqrt{4} \cdot \sqrt{7}}{3}$
 $x = \frac{2\sqrt{7}}{3}$

The length of the altitude to the hypo. of a right Δ is the **geometric mean** of the lengths of the segments of the hypotenuse.

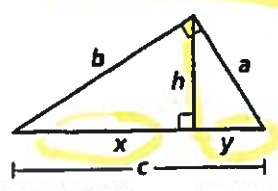


$\frac{AD}{CD} = \frac{CD}{DB}$
 altitude altitude

also, the altitude to the hypo. of a right Δ separates the hypo. so that the length of each leg of the Δ is the geometric mean of the length of the adjacent hypo. segment and the length of the hypo.

$\Delta ACD \sim \Delta ABC$ so, $\frac{AD}{AC} = \frac{AC}{AB}$

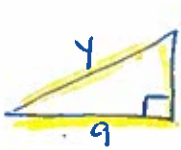
and $\Delta CBD \sim \Delta ABC$ so, $\frac{DB}{CB} = \frac{CB}{AB}$



Algebra Refer to the figure to complete each proportion.

7. $\frac{x}{h} = \frac{?}{y}$
 8. $\frac{a}{b} = \frac{?}{h}$
 9. $\frac{a}{b} = \frac{h}{?}$

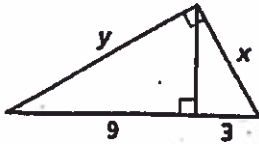
10. $\frac{a}{c} = \frac{y}{?}$
 11. $\frac{a}{c} = \frac{h}{?}$
 12. $\frac{b}{x} = \frac{?}{b}$



Algebra Find the values of the variables.



13.



$$\frac{AD}{AC} = \frac{AC}{AB}$$

long leg $\frac{9}{y} = \frac{y}{12}$ long leg
hyp y hyp

$$\sqrt{y^2} = \sqrt{108}$$

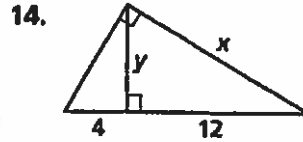
$$y = \sqrt{36} \cdot \sqrt{3}$$

$$y = 6\sqrt{3}$$

short leg $\frac{3}{x} = \frac{x}{12}$ hyp

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

$$x = 6$$



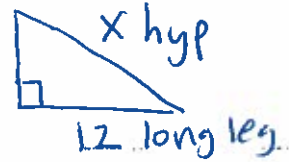
14.

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

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

$$y = \sqrt{16} \cdot \sqrt{3}$$

$$y = 4\sqrt{3}$$



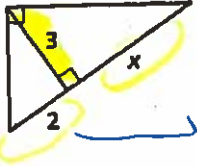
$$\frac{12}{x} = \frac{x}{16}$$

$$\sqrt{x^2} = \sqrt{192}$$

$$x = \sqrt{64} \cdot \sqrt{3}$$

$$x = 8\sqrt{3}$$

15.



altitude $\frac{3}{x} = \frac{2}{3}$ altitude

$$\frac{2x}{2} = \frac{9}{2}$$

$$x = 4.5$$

16.



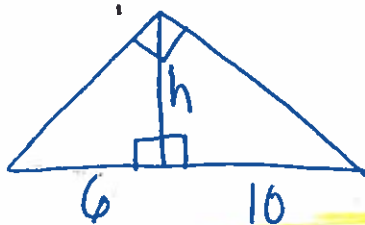
$$\frac{5}{x} = \frac{11}{y}$$

$$\sqrt{y^2} = \sqrt{55}$$

$$y = \sqrt{55}$$

$$\frac{5}{x} = \frac{x}{16}$$

19. The altitude to the hypotenuse of a right triangle divides the hypotenuse into segments 6 in. and 10 in. long. Find the length h of the altitude.



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

$$\sqrt{h^2} = \sqrt{60}$$

$$h = \sqrt{4} \cdot \sqrt{15}$$

$$h = 2\sqrt{15} \text{ in}$$

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(2-22 Even
27-29, 34, 36)