

### Chapter 11 – Similarity Review Packet

Solve the proportions.

1.  $\frac{13}{b} = \frac{18}{63}$

$b = \frac{13 \cdot 63}{18}$

$b = 45.5$

2.  $\frac{9}{8} = \frac{3}{x-3}$

$x-3 = \frac{8 \cdot 3}{9}$

$x-3 = \frac{8}{3}$

$x = \frac{8}{3} + 3 = \frac{17}{3}$  or  $5.\bar{6}$

3.  $\frac{x}{25} = \frac{x+1}{30}$

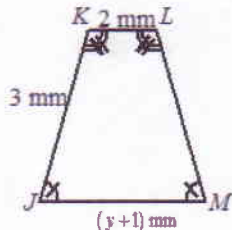
$30x = 25(x+1)$

$30x = 25x + 25$

$5x = 25$

$x = 5$

4. The trapezoids  $ABCD$  and  $JKLM$  below are similar, but not necessarily drawn to scale. Find the values of  $x$  and  $y$ .



$\frac{x-2}{3} = \frac{6}{2}$

$x-2 = \frac{3 \cdot 6}{2}$

$x-2 = 9$

$x = 11$

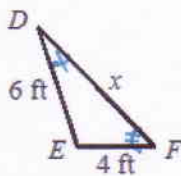
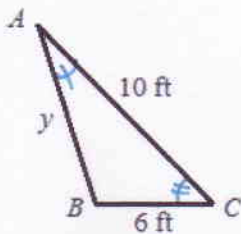
$\frac{15}{y+1} = \frac{6}{2}$

$y+1 = \frac{15 \cdot 2}{6}$

$y+1 = 5$

$y = 4$

5. Given that  $m\angle A \cong m\angle D$  and  $m\angle C \cong m\angle F$ , find  $x$  and  $y$ . (Round to the nearest two decimal places when necessary.)



$\frac{y}{6} = \frac{6}{4} = \frac{10}{x}$

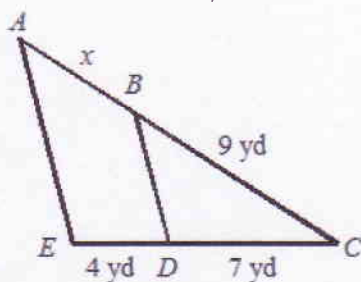
$x = \frac{4 \cdot 10}{6}$

$x = 6.\bar{6}$

$y = \frac{6 \cdot 6}{4}$

$y = 9$

6. Given that  $\overline{AE} \parallel \overline{BD}$ , find  $x$ .



$\frac{x}{4} = \frac{9}{7}$

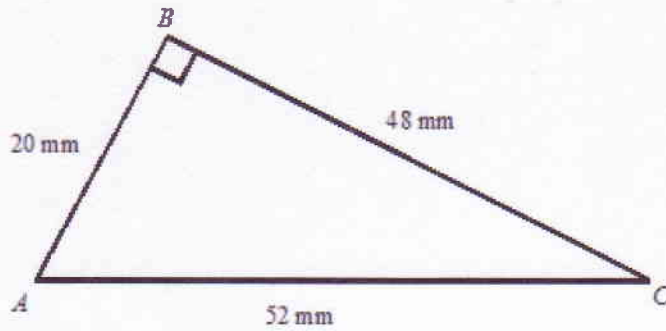
$x = \frac{4 \cdot 9}{7}$

$x = \frac{36}{7}$

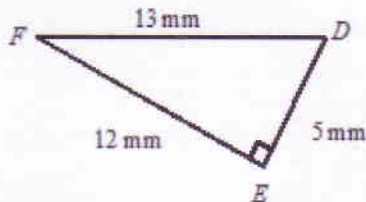
or

$5.14 \text{ yd}$

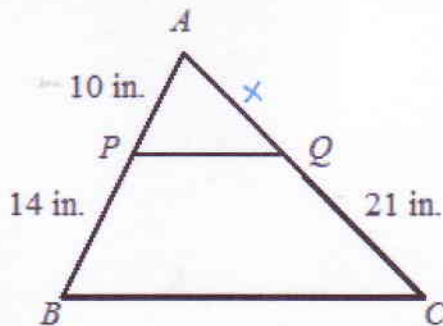
7. Are  $\triangle ABC$  and  $\triangle FDE$  similar? Explain why or why not.



$\triangle ABC$  and  $\triangle FDE$  are not similar, since  $\angle B \neq \angle D$ .



8.  $\overline{PQ} \parallel \overline{BC}$ , find the length of  $\overline{AC}$ .



Let  $AQ = x$ .  
 Since  $PQ \parallel BC$ ,  $\frac{10}{x} = \frac{14}{21}$   
 $x = \frac{21 \cdot 10}{14}$   
 $x = 15$

$AC = AQ + QC$   
 $= 15 + 21$   
 $AC = 36 \text{ in.}$

9. Standing next to each other, a man casts a 99.4-inch shadow and his 36-inch-tall daughter casts a 50.4-inch shadow. What is the height of the man to the nearest inch?



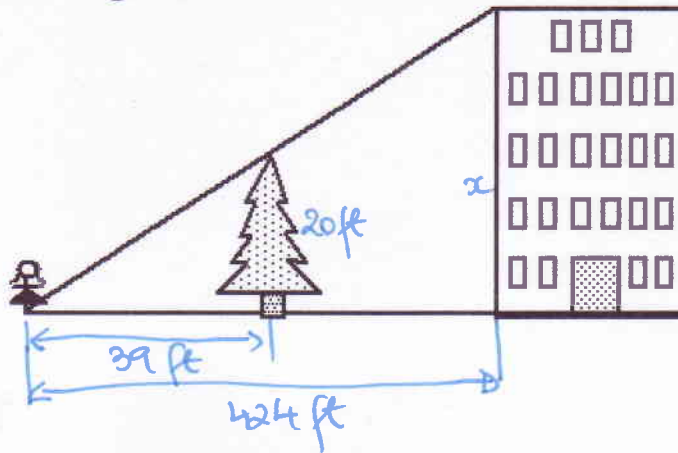
The 2 triangles are similar, so

$$\frac{x}{36} = \frac{99.4}{50.4}$$

$$x = \frac{36 \cdot (99.4)}{50.4}$$

$x = 71 \text{ inches}$

10. Brooke wants to find the height of the tallest building in her city. She stands 424 feet away from the building. There is a tree 39 feet in front of her that is 20 feet tall. How tall is the building to the nearest foot?

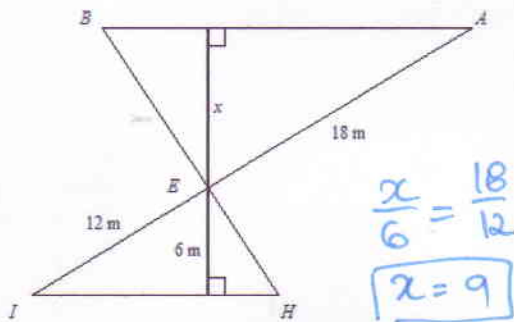


$$\frac{39}{424} = \frac{20}{x}$$

$$x = 217.4 \text{ ft}$$

The building is 217 ft tall.

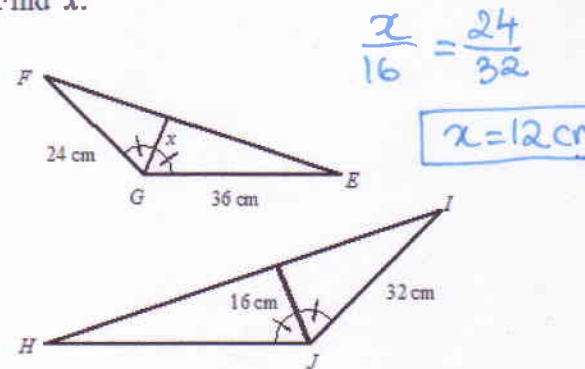
11.  $\triangle BAE \sim \triangle HIE$   
Find x.



$$\frac{x}{6} = \frac{18}{12}$$

$$x = 9$$

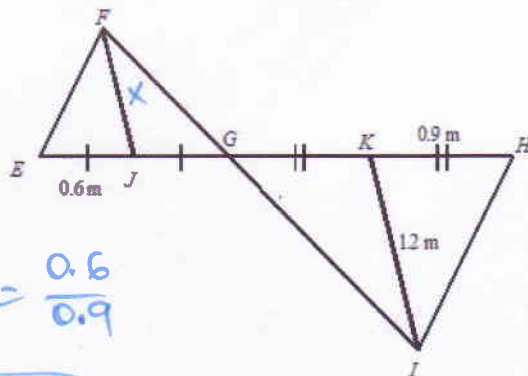
12.  $\triangle EFG \sim \triangle HIJ$   
Find x.



$$\frac{x}{16} = \frac{24}{32}$$

$$x = 12 \text{ cm}$$

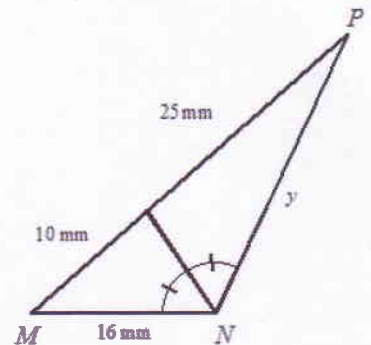
13.  $\triangle EFG \sim \triangle HIG$   
Find FJ.



$$\frac{x}{12} = \frac{0.6}{0.9}$$

$$x = 8 \text{ m}$$

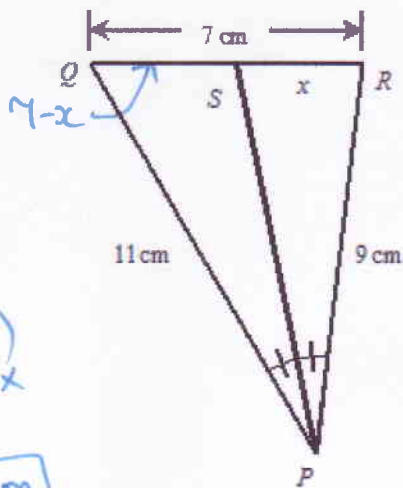
14. Find y.



$$\frac{16}{10} = \frac{y}{25}$$

$$y = 40$$

15. Find  $x$ .



$$\frac{11}{9} = \frac{7-x}{x}$$

$$11x = 9(7-x)$$

$$11x = 63 - 9x$$

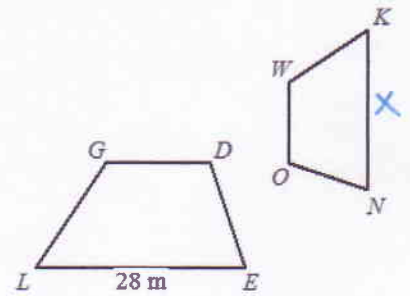
$$20x = 63$$

$$x = 3.15 \text{ cm}$$

16.  $KNOW \sim LEDG$

$$\frac{\text{Area of } KNOW}{\text{Area of } LEDG} = \frac{9}{16}$$

Find  $KN$ .

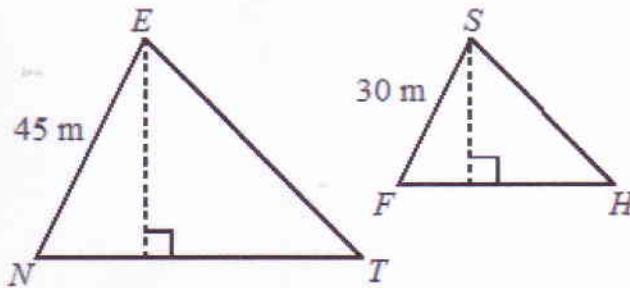


$$\frac{9}{16} = \left(\frac{x}{28}\right)^2 \quad (\text{take the square root of both sides})$$

$$\frac{3}{4} = \frac{x}{28} \rightarrow x = 21$$

17.  $\triangle FSH \sim \triangle NET$

The area of  $\triangle NET$  is 1323 square meters. Find the area of  $\triangle FSH$ .



$$\left(\frac{45}{30}\right)^2 = \frac{1323}{x}$$

$$\left(\frac{3}{2}\right)^2 = \frac{1323}{x}$$

$$\frac{9}{4} = \frac{1323}{x}$$

$$x = 588$$

18. The areas of corresponding faces of two similar triangular prisms are 121 square centimeters and 81 square centimeters. What is the ratio of the corresponding side lengths? of the perimeters?

corresponding side length ratio = ratio of perimeters = scale factor

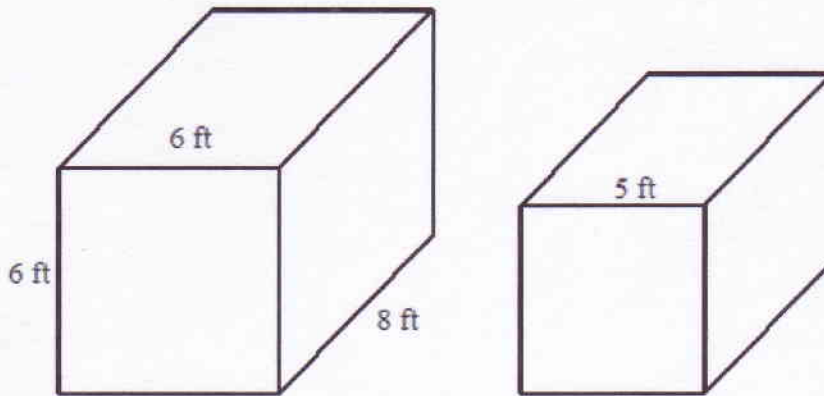
$$= \sqrt{\frac{121}{81}} = \frac{11}{9}$$

19. The rectangular shipping crates below are similar.

a. Find the similarity ratio of the crate on the left to the crate on the right.  $\rightarrow 6/5$

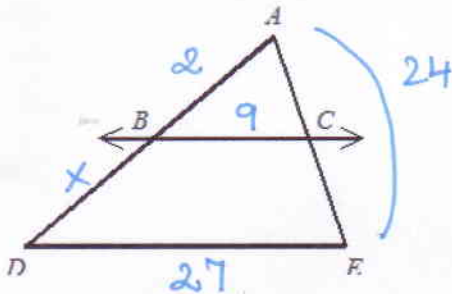
b. Find the ratio of their volumes.

$$\left(\frac{6}{5}\right)^3 = \frac{216}{125}$$



20.  $\overline{DE} \parallel \overline{BC}$ ,  $AB = 2$  yards,  $BC = 9$  yards,  $AE = 24$  yards, and  $DE = 27$  yards.

Find  $BD$ .



$$\frac{2}{9} = \frac{2+x}{27}$$

$$2+x = \frac{2 \cdot 27}{9}$$

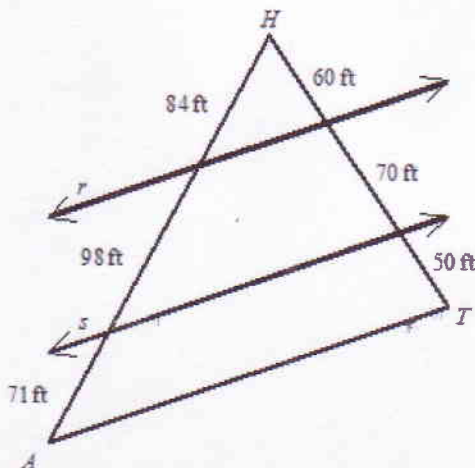
$$2+x = 6$$

$$\boxed{x=4}$$

21. a. Is  $s \parallel \overline{AT}$ ? no

b. Is  $r \parallel \overline{AT}$ ? no

c. Is  $r \parallel s$ ? yes.



$$\frac{84}{60} = 1.4 \quad \frac{98}{70} = 1.4 \quad \Rightarrow r \parallel s$$

$$\frac{71}{50} = 1.42 \quad \Rightarrow r \nparallel \overline{AT} \quad s \nparallel \overline{AT}$$

22.  $\triangle ABC \sim \triangle DBA$

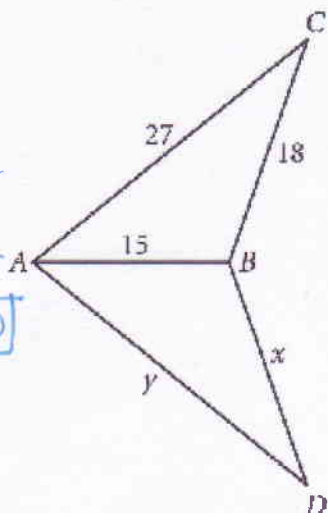
$x + y = \underline{35}$ .

$$\frac{15}{x} = \frac{18}{15} = \frac{27}{y}$$

$$x = \frac{15 \cdot 15}{18} = 12.5$$

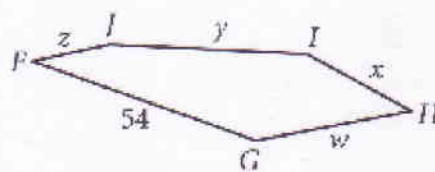
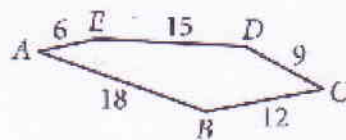
$$y = \frac{15 \cdot 27}{18} = 22.5$$

$\boxed{35.0}$



23.  $ABCDE \sim FGHIJ$

$w + x + y + z = \underline{126}$



$$\frac{18}{54} = \frac{12}{w} = \frac{9}{x} = \frac{15}{y} = \frac{6}{z}$$

$$w = \frac{54 \cdot 12}{18} = 36$$

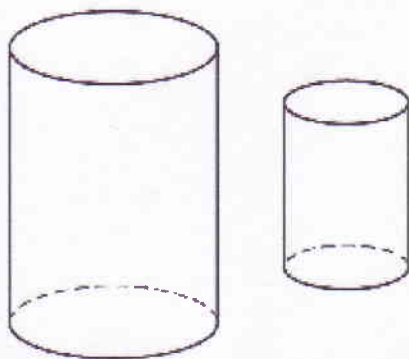
$$x = \frac{54 \cdot 9}{18} = 27$$

$$y = \frac{54 \cdot 15}{18} = 45$$

$$z = \frac{54 \cdot 6}{18} = 18$$

$\boxed{126}$

24. The dimensions of the smaller cylinder are three fifths the dimensions of the larger cylinder. The volume of the smaller cylinder is  $2160\pi \text{ cm}^3$ . Find the volume of the larger cylinder.



scale factor =  $\frac{3}{5}$   
 volume ratio =  $(\text{scale factor})^3$   
 $= \left(\frac{3}{5}\right)^3 = \frac{27}{125}$

$$\frac{2160\pi}{x} = \frac{27}{125}$$

$$x = \frac{2160\pi \cdot 125}{27}$$

$\boxed{x = 10000\pi}$

25. The ratio of the volumes of two spherical steel balls is 8:125. What is the ratio of their diameters?

$$\frac{8}{125} = (\text{scale factor})^3$$

$$\rightarrow \text{scale factor} = \sqrt[3]{\frac{8}{125}} = \frac{2}{5}$$

The ratio of their diameters is  $\boxed{\frac{2}{5}}$ .