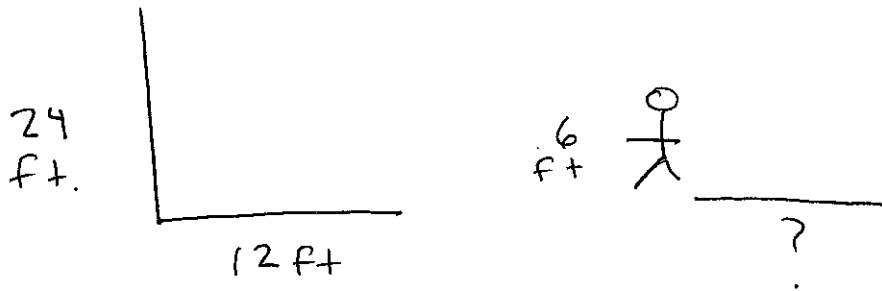


Similar Triangles: Applications

1. A tree 24 feet tall casts a shadow 12 feet long. Brad is 6 feet tall. How long is Brad's shadow? (draw a diagram and solve)

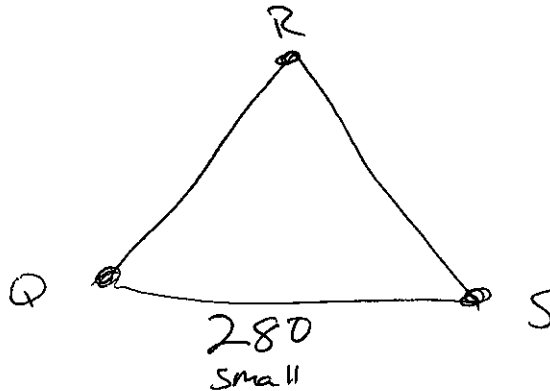
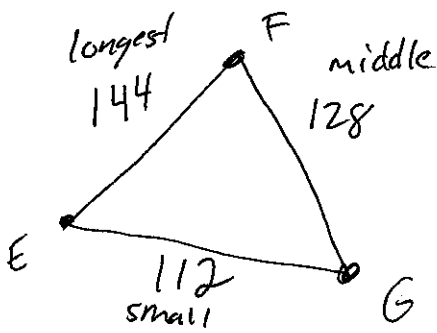


$$\frac{24}{6} \times \frac{12}{x}$$

$$\frac{24x}{24} = \frac{72}{24}$$

$$x = 3 \text{ ft}$$

2. Triangles EFG and QRS are similar. The length of the sides of EFG are 144, 128, and 112. The length of the smallest side of QRS is 280, what is the length of the longest side of QRS?

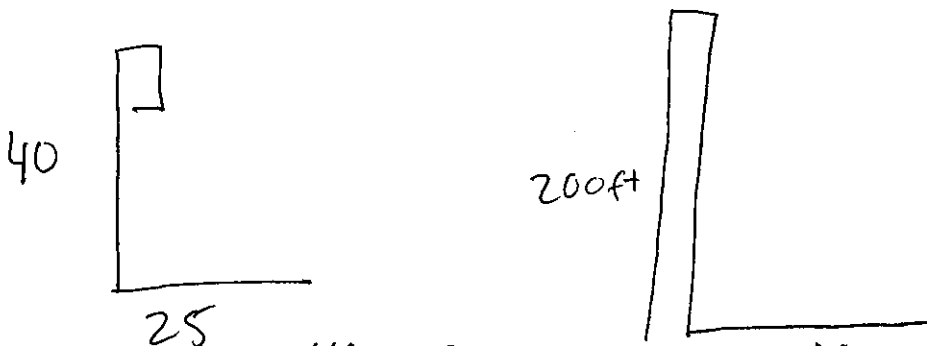


$$\frac{112}{280} \times \frac{144}{x}$$

$$\frac{112x}{112} = \frac{40320}{112}$$

$$x = 360$$

3. A 40-foot flagpole casts a 25-foot shadow. Find the shadow cast by a nearby building 200 feet tall.



$$\frac{40}{200} = \frac{25}{x}$$

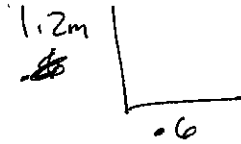
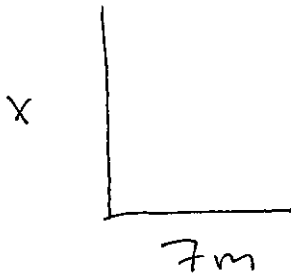
$$\frac{40x}{40} = \frac{5000}{40}$$

$$x = 125 \text{ ft}$$

Name: _____

Geometry

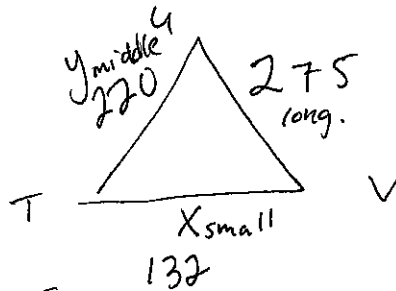
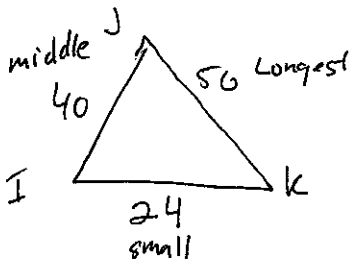
4. A tower casts a shadow 7 m long. A vertical stick casts a shadow 0.6 m long. If the stick is 1.2 m high, how high is the tower?



$$\frac{X}{1.2} = \frac{7}{0.6} \rightarrow \frac{.6x}{.6} = \frac{8.4}{.6}$$

$$x = 14 \text{ m}$$

5. Triangles IJK and TUV are similar. The length of the sides of IJK are 40, 50, and 24. The length of the longest side of TUV is 275, what is the perimeter of TUV? (draw a diagram and solve)



Perimeter \rightarrow Add all sides

$$220 + 275 + 132 = 627 \text{ units}$$

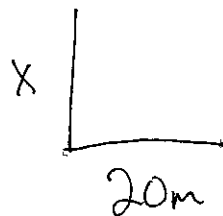
① Solve for small:

$$\frac{50}{275} \times \frac{24}{x} = \frac{50x = 11000}{50} \rightarrow x = 220$$

② Solve for middle

$$\frac{50}{275} = \frac{40}{y} \rightarrow \frac{50y = 11000}{50} \rightarrow y = 220$$

6. A tree with a height of 4m casts a shadow 15 m long on the ground. How high is another tree that casts a shadow which is 20 m long? (draw a diagram and solve)

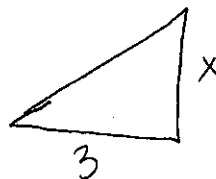
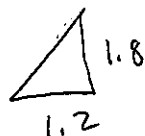
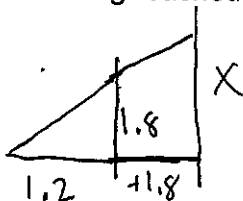


$$\frac{4}{x} = \frac{15}{20}$$

$$\frac{80}{15} = \frac{15x}{15}$$

$$x = 5.3 \text{ m}$$

7. The foot of a ladder is 1.2 m from a fence that is 1.8 m high. The ladder touches the fence and rests against a building that is 1.8 m behind the fence. Draw a diagram, and determine the height on the building reached by the top of the ladder.



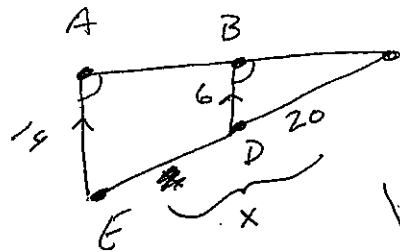
$$\frac{1.8}{x} = \frac{1.2}{3}$$

$$\frac{5.4}{1.2} = \frac{1.2x}{1.2}$$

$$x = 4.5 \text{ m}$$

Extension

Problem Solving



$$\frac{6}{14} = \frac{20}{x}$$

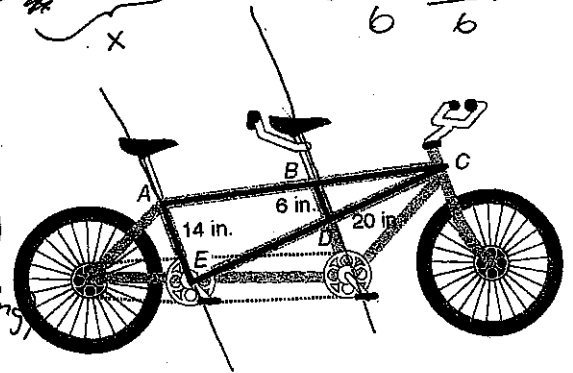
$$\frac{6x}{6} = \frac{280}{6}$$

Use the diagram for Exercises 1 and 2.

In the diagram of the tandem bike, $\overline{AE} \parallel \overline{BD}$.

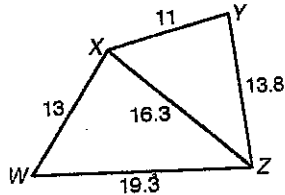
1. Explain why $\triangle CBD \sim \triangle CAE$.

$\overline{AA} \sim$, $\angle BCD \cong \angle ACE$ (same \angle)
 $\angle EAB \cong \angle DBC$ (corresponding)



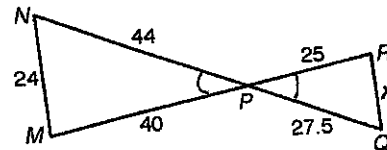
2. Find CE to the nearest tenth. 46.7 in

3. Is $\triangle WXZ \sim \triangle XYZ$? Explain.



Not similar, scale factor differs
 $\frac{13}{11} = \frac{16.3}{13.8} = \frac{19.3}{16.3}$ (sides are not proportional)

4. Find RQ. Explain how you found it.



$$\frac{44}{27.5} = \frac{8}{5}$$

$$\frac{40}{25} = \frac{8}{5}$$

Similar by SAS ~

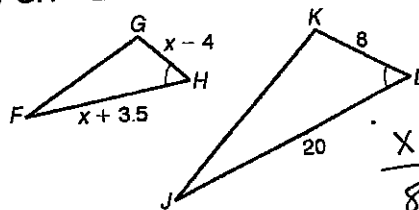
$$\therefore \frac{24}{x} = \frac{40}{25} \rightarrow 40x = 600$$

$$\frac{40}{40} \frac{40}{x} = \frac{600}{40}$$

$$x = 15$$

Choose the best answer.

5. Find the value of x that makes $\triangle FGH \sim \triangle JKL$.



A 8

C 12

B 9

D 16

$$\frac{x-4}{8} = \frac{x+3.5}{20}$$

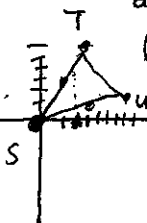
$$20(x-4) = 8(x+3.5)$$

$$20x - 80 = 8x + 28$$

$$12x = 108$$

$$x = 9$$

6. Triangle STU has vertices at S(0, 0), T(2, 6), and U(8, 2). If $\triangle STU \sim \triangle WXY$ and the coordinates of W are (0, 0), what are possible coordinates of X and Y?



F X(1, 3) and Y(4, 1)

G X(1, 3) and Y(2, 0)

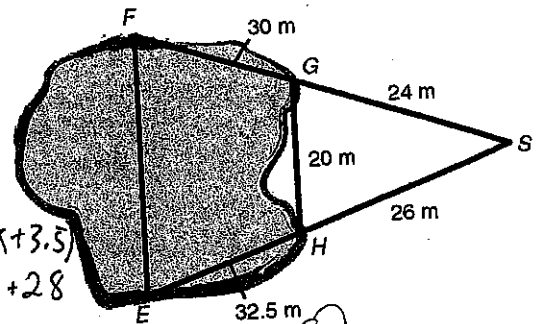
H X(3, 1) and Y(2, 4)

J X(0, 3) and Y(4, 0)

$$(2, 6) \rightarrow (1, 3)$$

$$(8, 2) \rightarrow (4, 1)$$

7. To measure the distance EF across the lake, a surveyor at S locates points E, F, G, and H as shown. What is EF?



A 25 m

B 36 m

C 45 m

D 90 m

$$\frac{12x}{12} = \frac{108}{12}$$

$$x = 9$$

$$\frac{20}{x} = \frac{24}{54}$$

$$1080 = 24x$$

$$\frac{1080}{24} = \frac{24x}{24}$$

$$45 = x$$