Starter:

Find the missing value in each proportion.

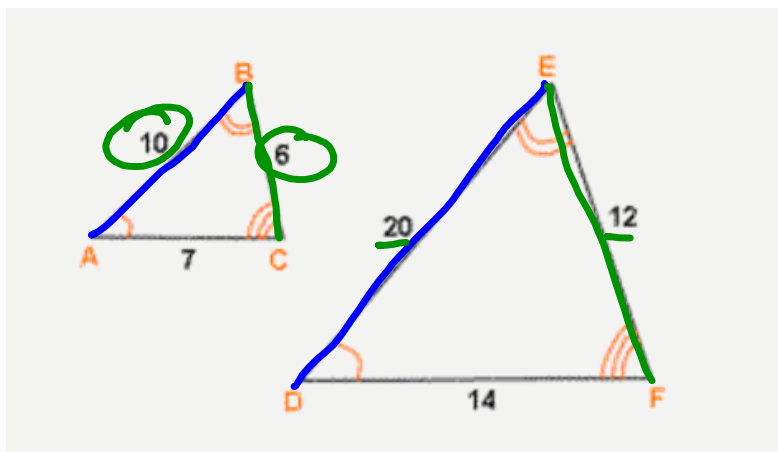$$\frac{1}{2} \overset{\cdot 2}{\underset{\cdot 2}{=}} \frac{2}{4}$$

$$\frac{7}{9} = \frac{21}{27}$$

8.2 Proportions

Objective:
- I can identify corresponding sides.
- I can solve proportions.

Proportion: an equation that equates two ratios

$$\frac{10}{20} = \frac{6}{12} \qquad \frac{20}{10} = \frac{12}{6}$$

$$10(12) = 20(6)$$

Solve each proportion.

$$\frac{3}{6} = \frac{y}{2}$$

$$3 \cdot 2 = 6v$$

$$\frac{6}{6} = \frac{6v}{6}$$

$$1 = v$$

$$\frac{7}{a} = \frac{8}{6}$$

$$42 = 8a$$

$$\frac{42}{8} = 5.25$$

Solve each proportion.

$$\frac{9}{7} \bcancel{=} \frac{y+6}{3} \qquad \frac{6}{7} \bcancel{=} \frac{2}{x-5}$$

$$9 \cdot 3 = 7(y+6) \qquad 6(x-5) = 14$$

$$27 = 7y + 42 \qquad 6x - 30 = 14$$

$$-42 \qquad -42 \qquad \overline{6x} + 30 \quad +30$$

$$\frac{-15}{7} = \frac{7y}{7} \qquad x = 7.3 \quad \frac{44}{6}$$

$$-\tfrac{5}{7} = 2\tfrac{1}{7} \text{ or } -2.14 = y$$

Solve each proportion.

$$\frac{m}{m-10} \diagdown \frac{5}{9}$$

$9 \cdot m = 5(m-10)$

$9m = 5m - 50$

$-5m \quad -5m$

$\dfrac{4m}{4} = -\dfrac{50}{4}$

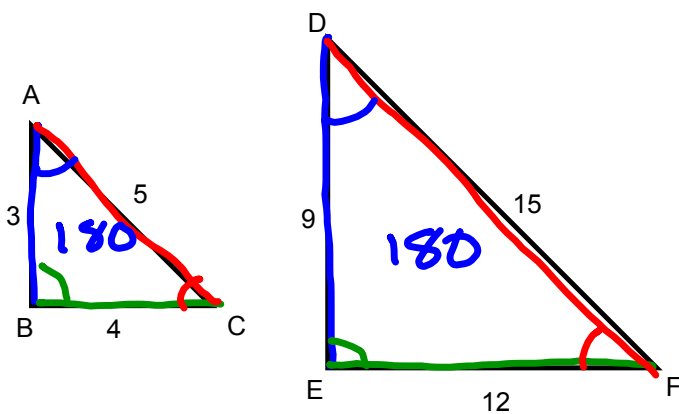$m = -12.5$

$$\frac{n}{5} \diagdown \frac{n-8}{3}$$

$3n = 5n - 40$

$-5n \quad -5n$

$\dfrac{-2n}{-2} = \dfrac{-40}{-2}$

$\boxed{n = 20}$

A

3   5

180

B   4   C

D

9   15

180

E   12   F

The triangles are similar.

$$\Delta ABC \sim \Delta DEF$$

$\overline{AB} \sim \overline{DE}$

$\overline{BC} \sim \overline{EF}$

$\overline{AC} \sim \overline{DF}$

$\angle A \cong \angle D$

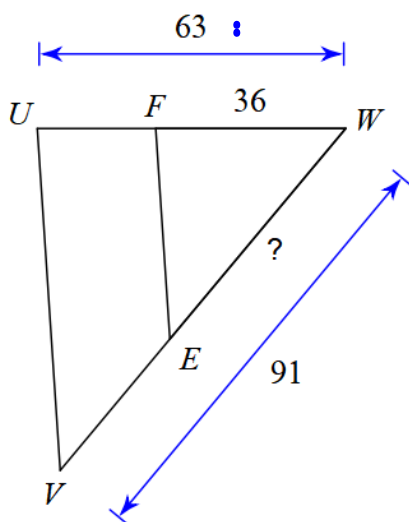$\angle B \cong \angle E$

$\angle C \cong \angle F$

The triangles are similar. Write a proportion and then find the missing side length.

$$\overline{UW} \sim \overline{FW}$$
$$\overline{WV} \sim \overline{WE}$$

63

U   F   36   W

?

E   91
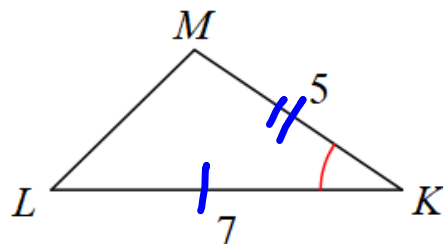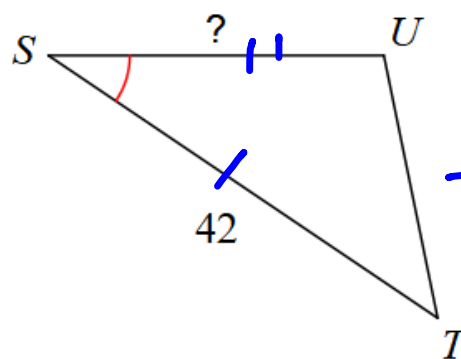
V

$$\frac{63}{36} \gtrless \frac{91}{x}$$

$$\frac{63x}{63} = \frac{36 \cdot 91}{63}$$

$$x = 52$$

Write a proportion and then find the
missing side length.
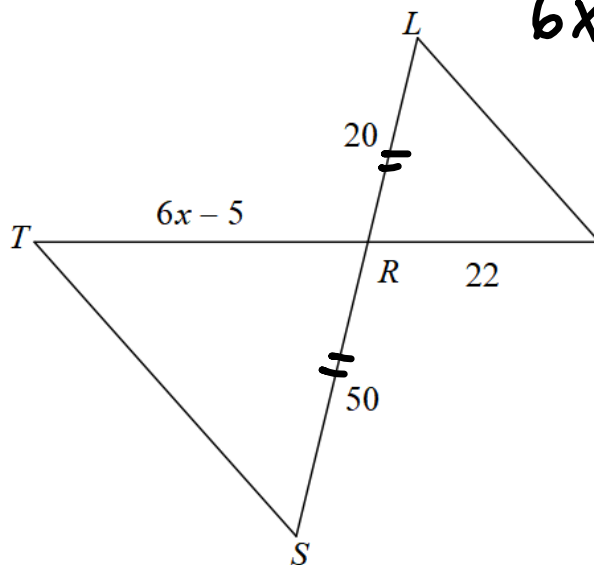
$\triangle STU \sim \triangle KLM$

$\dfrac{42}{7} = \dfrac{?}{5}$

$\dfrac{7x}{7} = \dfrac{42 \cdot 5}{7}$

$x = 30$

Write a proportion and then find the value of x.

$\triangle RST \sim \triangle RLM$

$$\frac{22}{6x-5} \bowtie \frac{20}{50}$$

$$1100 = 20(6x-5)$$

$$1100 = 100 + 120x$$

$$-100 \quad -100$$

$$\frac{1,200}{120} = \frac{120x}{120}$$

$$X = 10$$

Figure labels: L, 20, 6x − 5, T, R, 22, 50, S

Write a proportion and then find the value of x.

$$\triangle NML \sim \triangle NCD$$

$12x - 14 = 154$
$+14 +14$

$\dfrac{12x}{12} = \dfrac{168}{12}$

$x = 14$

$42 \quad \bullet \quad 42$

N

$12x - 14 \quad \bullet \quad 154$

$M \qquad L$
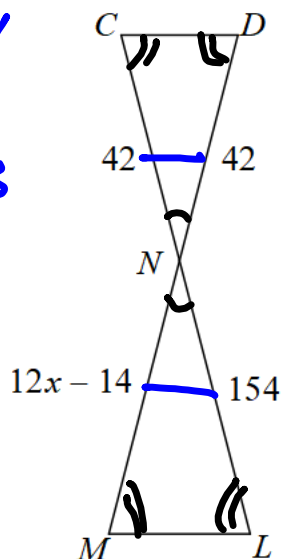
$\boxed{x = 14}$

$\dfrac{42}{154} \times \dfrac{42}{12x-14}$

$6468 = 42(12x - 14)$
$6468 = 504x - 588$
$7056 = 504x$