Unit 4 Similarity Review Guide   Name **Mrs. MacDonald**
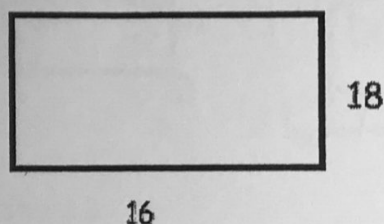
6.1 and 6.2

1. The Cardinals won 15 out of the last 20 games played.

   a. What is the ratio of games lost to games won? $5:15$ $\boxed{1:3}$

   b. What is the ratio of games won out of total games played? $15:20$ $\boxed{3:4}$

   c. What is the ratio of games lost to games played? $5:20$ $\boxed{1:4}$

2. Find the ratio of the length to the width of the rectangle.

$16:18$ $\boxed{8:9}$

OR

$18:16$ $\boxed{9:8}$

3. Given $\dfrac{a}{b} = \dfrac{3}{5}$, write 2 other ways to write this proportion.

$$\dfrac{b}{a} = \dfrac{5}{3} \quad \text{OR} \quad \dfrac{a}{3} = \dfrac{b}{5} \quad \text{OR} \quad \dfrac{3}{a} = \dfrac{5}{b}$$

4. Find the value of x. Show your work

$$\dfrac{5}{10} = \dfrac{x}{16} \quad 10x = 80$$
$$\boxed{x = 8}$$

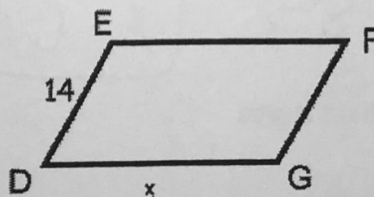$$\dfrac{7}{y-3} = \dfrac{14}{y} \quad \begin{array}{l} 7y = 14y - 42 \\ 42 = 7y \end{array} \quad \boxed{y = 6}$$

5. If ED : DG is 2:7, find the value of x.

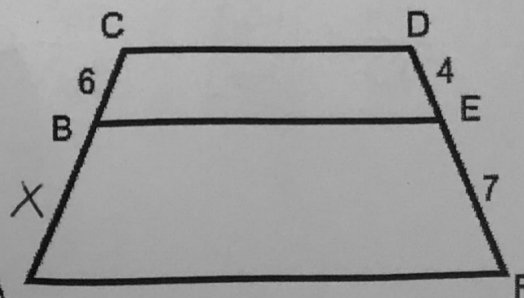$$\dfrac{2}{7} = \dfrac{14}{x} \quad 2x = 98$$
$$\boxed{x = 49}$$

7. Given $\dfrac{AB}{AC} = \dfrac{FE}{FD}$, Find AB
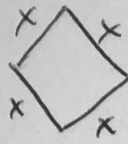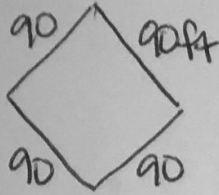
$$\dfrac{x}{x+6} = \dfrac{7}{11} \quad \begin{array}{l} 11x = 7x + 42 \\ 4x = 42 \end{array}$$
$$\boxed{x = 10.5 = AB}$$

8. You are making a scale model of your school's baseball diamond as part of an art project. The distance between two consecutive bases is 90 feet. If you use a scale factor of 1/180 to build your model, what will be the distance around the bases of your model?

90 90ft

90 90

x

$\frac{x}{90} = \frac{1}{180}$ $180x = 90$
$x = .5ft$

Perimeter $= (.5) \times 4 = \boxed{2 feet}$

6.3 Use Similar Polygons

9. Given MNOP~QRST,

a. What is the scale factor? $\frac{21}{14} = \boxed{\frac{3}{2}}$

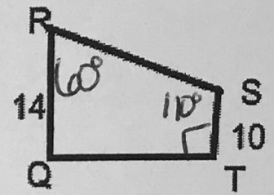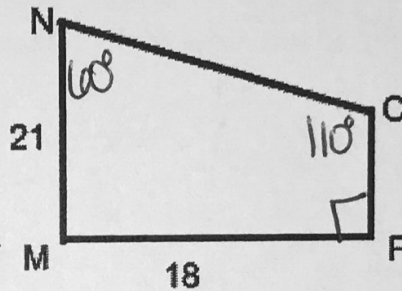b. Find QT $\frac{21}{14} = \frac{18}{x}$ $21x = 252$
$\boxed{x = 12}$

c. Find OP $\frac{21}{14} = \frac{y}{10}$ $14y = 210$
$\boxed{y = 15}$

60
21
110
M   18   P
N   O

R
14 60   110   S
Q   T   10

d. Given $\angle P = 90°, \angle O = 110°, \angle R = 60°, Find \angle M$

$360° - 60° - 110° - 90° = \boxed{100°}$

10. Two similar posters have a scale factor of 4:5. The large poster's perimeter is 85 in. Find the small poster's perimeter.
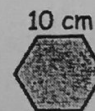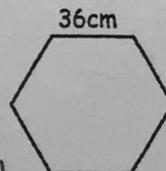
$\frac{4}{5} = \frac{x}{85}$ $5x = 340$
$\boxed{x = 68 in}$

11.3 Perimeter and Area of Similar Figures

36cm

10 cm

11. Find the ratio of perimeter and the ratio of area.
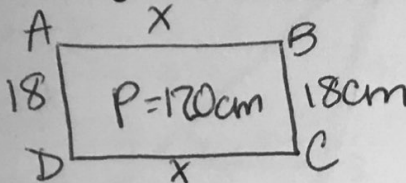
↓

$\frac{36}{10} = \boxed{\frac{18}{5}}$

↓

$\frac{18^2}{5^2} = \boxed{\frac{324}{25}}$

12. Two pentagons are similar. The ratio of the areas is 150: 40. What is the ratio of perimeters?

$$\frac{150}{40} = \frac{15}{4} \rightarrow \frac{\sqrt{15}}{\sqrt{4}} = \boxed{\frac{\sqrt{15}}{2} \text{ or } \frac{3.87}{2}}$$

13. Rectangle ABCD is similar to rectangle EFGH. The width of ABCD is 18cm. and the perimeter is 120 cm. The length of EFGH is 91 cm. Find the ratio of the side lengths of ABCD to EFGH.

A ——x—— B
18 | P=120cm | 18cm
D ——x—— C

$P = 2l + 2w$
$P = 2x + 2(18)$
$120 = 2x + 36$
$84 = 2x$
$x = 42cm$

$\frac{length\ ABCD}{length\ EFGH} = \frac{42}{91} = \boxed{\frac{6}{13}}$

14. The ratio of side lengths is 3:8. The area of the larger polygon is 320 ft², what is the area of the smaller polygon?

$$\frac{3^2}{8^2} = \frac{9}{64}$$

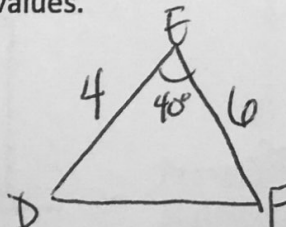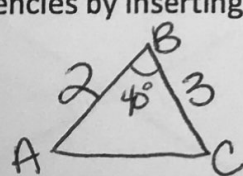$$\frac{9}{64} = \frac{x}{320}$$

$64x = 2880$

$\boxed{x = 45 ft^2}$

6.4 and 6.5

15. Define Similar Triangles: congruent angles, proportional sides same shape

16. List the three ways of proving triangles SIMILAR. Draw examples of each and show proportions or congruencies by inserting values.
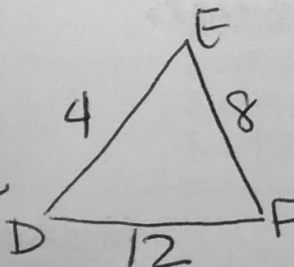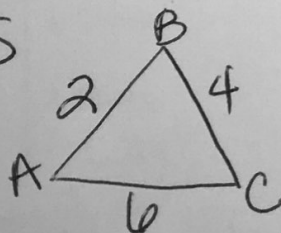
Method 1 SAS

$\frac{2}{4} = \frac{1}{2}$ ✓

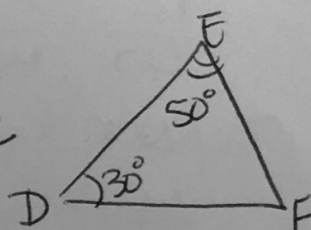$\frac{3}{6} = \frac{1}{2}$ ✓

$\angle B \cong \angle E$

Method 2 SSS

$\frac{2}{4} = \frac{1}{2}$ ✓

$\frac{4}{8} = \frac{1}{2}$ ✓

$\frac{6}{12} = \frac{1}{2}$ ✓

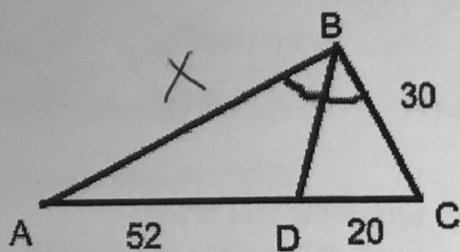Method 3 AA
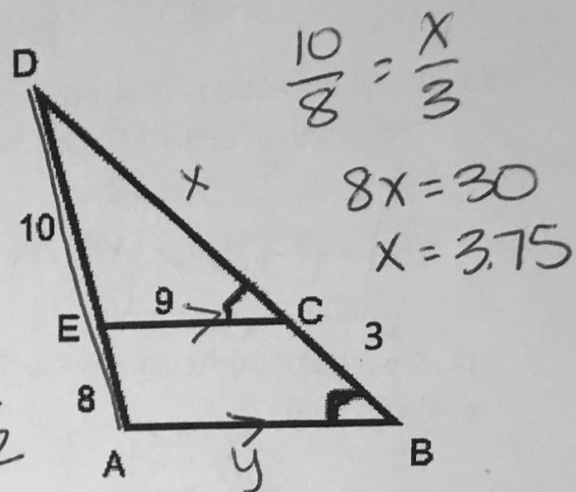

$\angle A \cong \angle D$

$\angle B \cong \angle E$

6.6
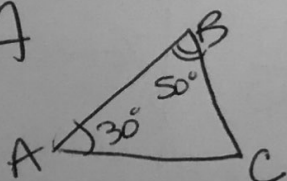
17. Find the following lengths and show your proportions for each picture.

$AB = 78$

$$\frac{52}{x} = \frac{20}{30} \quad 20x = 1560$$
$$x = 78$$

$$\frac{10}{9} = \frac{18}{y}$$
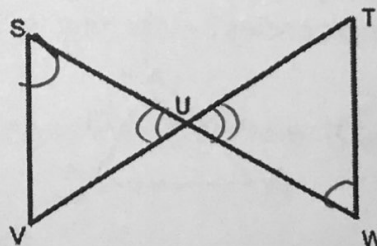
$$10y = 162$$
$$y = 16.2$$

$AB = 16.2$

$$\frac{10}{8} = \frac{x}{3}$$

$$8x = 30$$
$$x = 3.75$$

$DB = 3.75 + 3 = 6.75$

Similarity Proofs:

1. Given $\angle S \cong \angle W$

   Prove: $\triangle SUV \quad \triangle TUW$

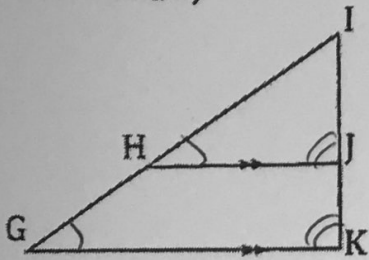 | Statements | Reasons |
   |---|---|
   | $\angle S \cong \angle W$ | Given |
   | $\angle SUV \cong \angle WUT$ | Vertical Angles |
   | $\triangle SUV \sim \triangle WUT$ | AA |

2. Given: $\dfrac{NO}{QO} = \dfrac{PO}{MO}$

   Prove: $\triangle MNO \sim \triangle PQO$
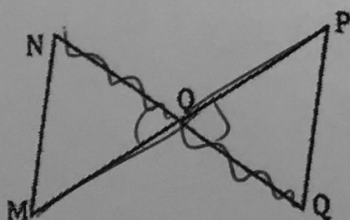
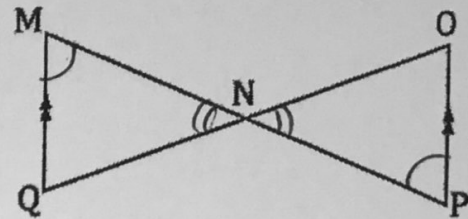 | Statements | Reasons |
   |---|---|
   | $\dfrac{NO}{QO} = \dfrac{PO}{MO}$ | Given |
   | $\angle NOM \cong \angle QOP$ | Vertical angles |
   | $\triangle MNO \sim \triangle PQO$ | SAS |

Given: $\overline{GK} \parallel \overline{HJ}$

Prove: $\triangle GIK \sim \triangle HIJ$

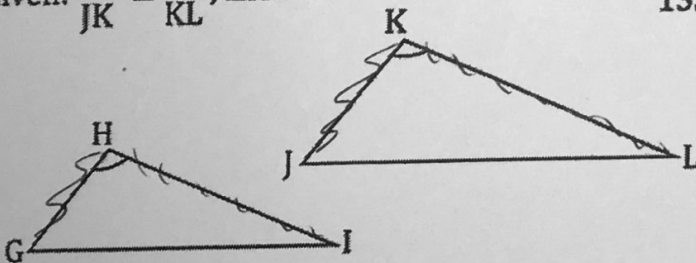| Statements	Reasons
1. $\overline{GK} \parallel \overline{HJ}$	1. Given
2. $\angle IJH \cong \angle IKG$	2. Corresponding Angles
3. $\angle G \cong \angle JHI$	3. Corresponding Angles
4. $\triangle GIK \sim \triangle HIJ$	4. AA

Given: $\overline{MQ} \parallel \overline{OP}$

Prove: $\triangle MNQ \sim \triangle PNO$

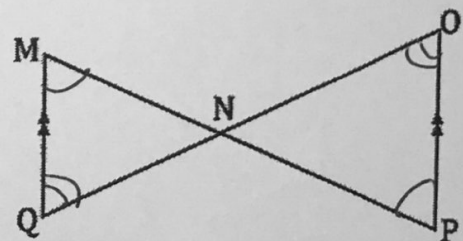| Statements	Reasons
1. $\overline{MQ} \parallel \overline{OP}$	1. Given
2. $\angle QMN \cong \angle OPN$	2. Alt. Int. Angles
3. $\angle MNQ \cong \angle PNO$	3. Vertical Angles
4. $\triangle MNQ \sim \triangle PNO$	4. AA

Given: $\dfrac{GH}{JK} = \dfrac{HI}{KL}$, $\angle H \cong \angle K$

Prove: $\triangle GHI \sim \triangle JKL$

Statements	Reasons
1. $\dfrac{GH}{JK} = \dfrac{HI}{KL}$	1. Given
2. $\angle H \cong \angle K$	2. Given
3. $\triangle GHI \sim \triangle JKL$	3. SAS

13. Given: $\overline{MQ} \parallel \overline{OP}$

Prove: $\triangle MQN \sim \triangle OPN$

Statements	Reasons
1. $\overline{MQ} \parallel \overline{OP}$	1. Given
2. $\angle QMN \cong \angle OPN$	2. Alt. Int. Angles
3. $\angle MQN \cong \angle PON$	3. Alternate Interior Angles
4. $\triangle MQN \sim \triangle OPN$	4. AA