Tuesday, February 10, 2015 - Day 1

AIM
SWBAT solve problems involving similar figures.

DO NOW
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HW
Pages 8 & 9
**Quiz Friday 2/13 on Proportional Geometry**
HOMEWORK - SIMILAR TRIANGLES

List ALL corresponding parts (sides and angles) for each of the following.

1) \( \triangle MNP \) \( \sim \) \( \triangle MQR \)
   - Corresponding angles: \( \angle M, \angle N, \angle P \) \( \sim \) \( \angle M, \angle N, \angle P \)
   - Corresponding sides: \( MN \sim MP \) \( NP \sim QR \) \( PQ \sim NR \)

2) \( \triangle HJK \) \( \sim \) \( \triangle KIL \)
   - Corresponding angles: \( \angle H, \angle J, \angle K \) \( \sim \) \( \angle K, \angle I, \angle L \)
   - Corresponding sides: \( HK \sim KL \) \( HJ \sim IL \) \( JK \sim LI \)

3) \( \triangle ABC \) \( \sim \) \( \triangle DEF \)
   - Corresponding angles: \( \angle A, \angle B, \angle C \) \( \sim \) \( \angle D, \angle E, \angle F \)
   - Corresponding sides: \( AB \sim DE \) \( AC \sim DF \) \( BC \sim EF \)

Each of the following pairs of triangles is similar. Find the missing sides using a proportion. Show all work!

4) Solve for \( x \) given \( \triangle \) big \( \sim \) \( \triangle \) little
   - \( \frac{x}{6} = \frac{25}{10} \)
   - \( 10x = 150 \)
   - \( x = 15 \text{ ft} \)

5) Solve for \( x \) given \( \triangle \) big \( \sim \) \( \triangle \) little
   - \( \frac{12}{x} = \frac{45}{30} \)
   - \( \frac{45x}{45} = \frac{360}{45} \)
   - \( x = 8 \text{ ft} \)
6) Solve for $x$

\[ \frac{6}{x} = \frac{8}{4} \]
\[ 4x = 48 \]
\[ x = 12 \text{ ft} \]

\[ \frac{9}{y} = \frac{8}{6} \]
\[ 6y = 72 \]
\[ y = 12 \text{ ft} \]

7) Solve for $x$ and $y$

\[ \frac{x}{y} = \frac{18}{45} \]
\[ 45x = 630 \]
\[ x = 14 \text{ mm} \]

\[ \frac{x}{y} = \frac{18}{45} \]
\[ 45y = 450 \]
\[ y = 10 \text{ mm} \]

8) Solve for $x$ and $y$

\[ \frac{25}{x} = \frac{20}{8} \]
\[ 20x = 200 \]
\[ x = 10 \text{ m} \]

\[ \frac{30}{y} = \frac{20}{8} \]
\[ 20y = 240 \]
\[ y = 12 \text{ m} \]
**AIM:** SWBAT solve problems involving similar figures.

**DO NOW:**

The following pair of triangles is similar. Solve for the missing sides algebraically. (Solve for x AND y)

1) \[ \begin{align*}
\text{little} & \quad \frac{8}{x} = \frac{6}{9} \\
\text{big} & \\
\frac{6x}{6} & = \frac{72}{6} \\
x & = 12 \text{ in}
\end{align*} \]

\[ \begin{align*}
\text{little} & \quad \frac{6}{y} = \frac{10}{9} \\
\text{big} & \\
\frac{6y}{6} & = \frac{90}{6} \\
y & = 15 \text{ in}
\end{align*} \]

Tell whether the figures are similar. Justify your answer.

**No, they're not similar.**

**Diagrams are NOT drawn to scale**

2) \[ \begin{align*}
\frac{6}{2} & = \frac{3}{1} \\
\frac{12}{6} & = \frac{2}{1} \\
\frac{14}{7} & = \frac{2}{1}
\end{align*} \]

3) \[ \begin{align*}
\frac{9}{3} & = \frac{3}{1} \\
\frac{9}{3} & = \frac{3}{1} \\
\frac{15}{5} & = \frac{3}{1}
\end{align*} \]

**Yes, they’re similar**
**CLASSWORK:**

Set up and solve a proportion for each word problem. Draw a picture to help you.

1) The two rectangular picture frames are similar. What is the height of the larger picture frame?

![Diagram of two rectangles with proportions]

\[
\begin{align*}
\text{big} & \quad x = \frac{4.2}{2} \\
\text{little} & \quad \frac{3x}{3} = \frac{8.4}{3} \\
\end{align*}
\]

\[x = 2.8\text{ ft}\]

2) A 9-foot tall street sign casts a 12 foot shadow. The lamppost next to it casts a 24 foot shadow. How tall is the lamppost?

![Diagram of a street sign and lamppost with proportions]

\[
\begin{align*}
\text{let } x & = \text{height of the lamppost} \\
\frac{9}{x} & = \frac{12}{24} \\
12x & = 216 \\
x & = 18\text{ ft}
\end{align*}
\]

3) The official size of a basketball court in the NBA is 94 feet by 50 feet. The basketball court in the school gym is 47 feet long. How wide must it be to be similar to the NBA court?

![Diagram of NBA and school courts with proportions]

\[
\begin{align*}
\text{let } x & = \text{width of the school gym} \\
\frac{94}{x} & = \frac{50}{47} \\
94x & = 2350 \\
x & = \frac{2350}{94} \\
x & = 25\text{ ft}
\end{align*}
\]

4) Mrs. Smith is 5 feet 6 inches tall. She notices that her shadow is 3 feet long and the shadow of a nearby water tower is 75 feet long. How tall is the water tower?

![Diagram of Mrs. Smith and water tower with proportions]

\[
\text{let } x = \text{height of the water tower}
\]
5) A 6-foot ladder touches the side of a building at a point 5 feet above the ground. At what height would a 15 foot ladder touch the building if it makes the same angle with the ground as the shorter ladder.

6) A tree 30 feet tall casts a shadow 20 feet long. At the same time, a 75 foot building casts a shadow. How long is the building's shadow?

**HOMEWORK - SOLVING PROBLEMS WITH SIMILAR FIGURES**

Set up and solve a proportion for each word problem. Be sure to label your answer. Draw a picture to help you.

1) A vertical yardstick casts a shadow $2 \frac{1}{2}$ feet long. At the same time, a pole casts a shadow 15 feet long. Find the height of the pole.

2) A 10-foot ladder touches the side of a building at a point that is 8 feet above the ground. At what height would a 7-foot ladder touch the building if it makes the same angle with the ground as the longer ladder?
3) A tree casts a shadow 40 feet long. At the same time, a boy 5 feet 9 inches tall casts a shadow that is 8 feet long. Find the height of the tree.

4) A basketball hoop casts a shadow that is 8 feet long. At the same time, Mike casts a shadow that is 4.5 feet long. If Mike is 5 feet, six inches tall, how tall is the basketball hoop? Round to the nearest tenth.

5) The Navy Pier Ferris Wheel in Chicago is 150-ft tall. If the Ferris Wheel casts a $37\frac{1}{2}$ ft shadow, find the height of a woman standing nearby who casts a $1\frac{1}{2}$ ft shadow.

6) Find the distance from the cabin to the dining hall if $\triangle QRS$ is similar to $\triangle RTU$. 