**Learning Target(s):** I am able to determine whether or not two figures are similar.
I am able to write similarity statements and statements of proportionality.
I am able to use similarity to solve for missing sides, perimeters, or special segments.

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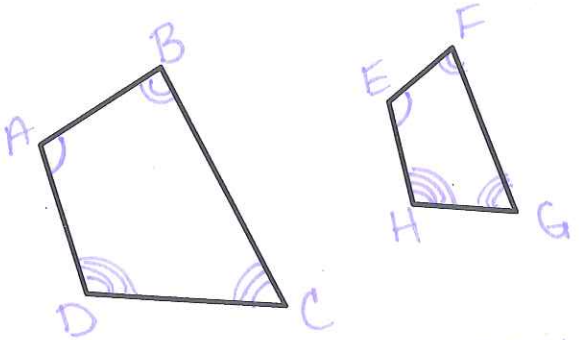
## Notes: 6.3 Use Similar Polygons

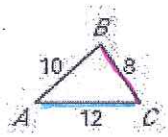
**similar polygons:** if corresponding angles are congruent & corresponding side lengths are proportional




ABCD ~ EFGH

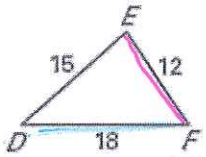
**Ex. 1**
In the diagram, $\Delta ABC \sim \Delta DEF$ .

a. List all pairs of congruent angles.




$\angle A \cong \angle D, \angle B \cong \angle E, \angle C \cong \angle F$

b. Check that the ratios of corresponding side lengths are equal.




$\frac{AB}{DE} = \frac{10}{15} = \frac{2}{3}$ ✓ $\quad \frac{BC}{EF} = \frac{8}{12} = \frac{2}{3}$ ✓ $\quad \frac{AC}{DF} = \frac{12}{18} = \frac{2}{3}$ ✓

c. Write the ratios of the corresponding side lengths in a statement of proportionality.

$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

**scale factor:** If 2 polygons are similar, then the ratio of the lengths of 2 corresponding sides is the scale factor

**Ex. 2**
Determine whether the polygons are similar. If they are, write a similarity statement and find the scale factor of ABCD to JKLM.

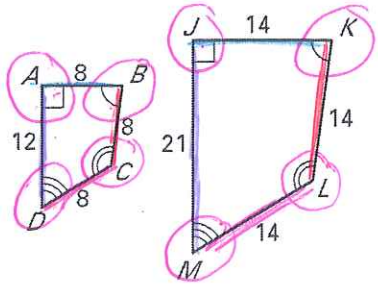
① corr. $\angle$s $\cong$ ✓

② corr. side lengths proportional ✓

③ ABCD ~ JKLM

④ scale factor: $\frac{4}{7}$

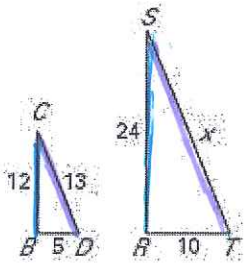
$\frac{8}{14} = \frac{4}{7}$ ✓ $\quad \frac{8}{14} = \frac{4}{7}$ ✓ $\quad \frac{8}{14} = \frac{4}{7}$ ✓ $\quad \frac{12}{21} = \frac{4}{7}$ ✓



**Ex. 3**
In the diagram, $\Delta BCD \sim \Delta RST$. Find the value of x.

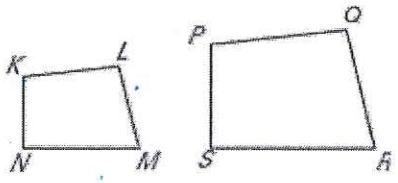
$\frac{12}{24} = \frac{13}{x}$ $\quad \frac{12x}{12} = \frac{312}{12}$

$x = 26$




**Perimeters of Similar Polygons Theorem:**

If two polygons are similar, then the ratio of their perimeters is equal to the ratios of their corresponding side lengths.




**Ex. 4**
A larger cement court is being poured for a basketball hoop in place of a smaller one. The court will be 20 feet wide and 25 feet long. The old court was similar in shape, but only 16 feet wide. x ? long old

a. Find the scale factor of the new court to the old court.

$\frac{20\text{ ft}}{16\text{ ft}} = \frac{5}{4}$

b. Find the perimeters of the new court and the old court.

new $P = 2l + 2w$
$P = 2(25) + 2(20) = 90$ ft

old $\frac{5}{4} = \frac{90}{x}$ $\quad \frac{5x}{5} = \frac{360}{5}$

$x = 72$ ft

**Corresponding Lengths in Similar Polygons:**

If two polygons are similar, then the ratio of any two corresponding lengths in the polygons is equal to the scale factor of the similar polygons.

**Ex. 5**
In the diagram, $\Delta FGH \sim \Delta JGK$. Find the length of the altitude $\overline{GL}$.

$\frac{14}{x} = \frac{10}{16}$

$x = 22.4$

$\frac{10x}{10} = \frac{224}{10}$