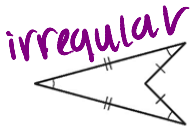
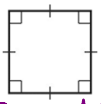
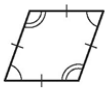
Chapter 7: Similarity

What I Need to Know	Example
6.1 Properties of Polygons	
Classify polygons based on their angles and sides.	

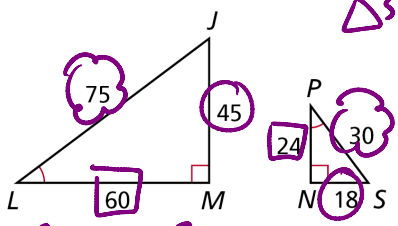
Number of Sides	Name of Polygon
3	triangle
4	quadrilateral
5	pentagon
6	hexagon
7	heptagon
8	Octagon
9	nonagon
10	decagon
12	dodecagon
15	pentadecagon
n	n-gon

Determine if the polygon is regular, irregular, concave, or convex.	 irregular concave  Regular convex  irregular convex
Calculate the sum of the interior angles of a polygon. $*S_{Int} = (n-2)\cdot 180$	Find the sum of the interior angles of a regular convex 15-gon. $S_I = (15-2)(180)$ $\boxed{S_I = 2{,}340}$
Calculate the sum of the exterior angles of a polygon. $*\ S_E = 360°$	Find the sum of the exterior angles of a regular convex 15-gon $S_E = 360°$

What I Need to Know	Example
7.1 Ratios in Similar Polygons	
Determine if polygons are similar and write a similarity statement.	Determine if polygons are similar and write a similarity statement.

3 ways to Prove ~ Δ's
AA~
SAS~
SSS~

* ∠'s are ≅ * sides are proportional



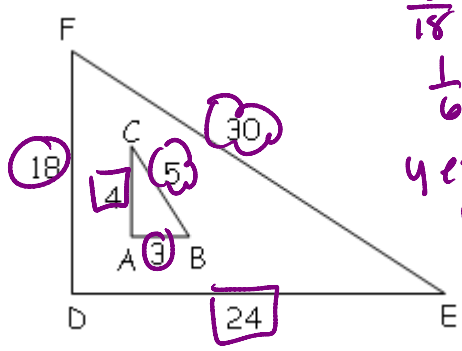
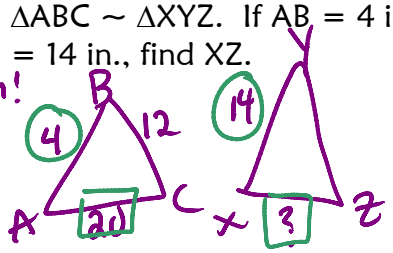
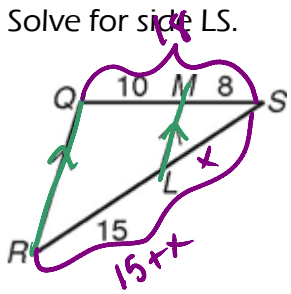
Δ's are ~ by AA~ or SSS~

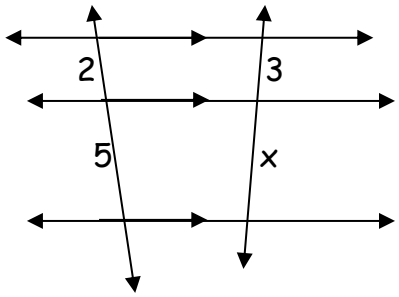
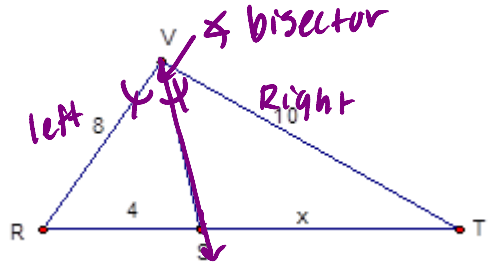
$\boxed{\Delta LMJ \sim \Delta PNS}$

$\frac{45}{18} \stackrel{?}{=} \frac{60}{24} \stackrel{?}{=} \frac{75}{30}$

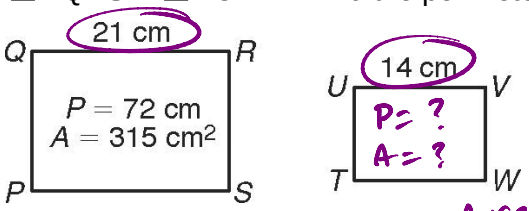
$2.5 = 2.5 = 2.5$ ✓

Scale Factor: $\frac{5}{2}$

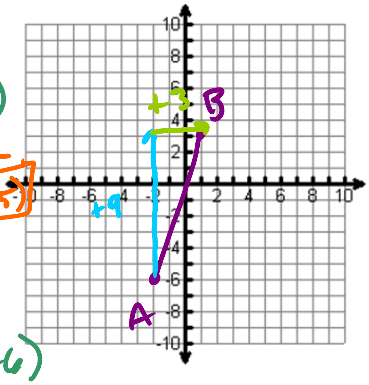
What I Need to Know	Example
7.2 Ratio and Proportion	
Write and Simplify Ratios and Proportions. cross multiply!	Solve for x. $\frac{7}{x+4} = \frac{8}{x}$ $7x = 8(x+4)$ $7x = 8x + 32$ $-x = 32$ $\boxed{x = -32}$
7.3 Triangle Similarity AA, SSS, SAS	
Identify the postulate used to show triangles are similar.	Determine if the polygons are similar. If so, state the theorem and similarity statement.  $\frac{3}{18} \stackrel{?}{=} \frac{4}{24} \stackrel{?}{=} \frac{5}{30}$ $\frac{1}{6} = \frac{1}{6} = \frac{1}{6}$ ✓ yes $\triangle FDE \sim \triangle BAC$ by SSS ~ be careful when writing ~ statement... order matters!
Find the side lengths of similar triangles. Draw your own Diagram! match up corresponding sides ... sides are PROPORTIONAL!! (not ≅)	$\triangle ABC \sim \triangle XYZ$. If AB = 4 in., BC = 12 in., AC = 20 in., and XY = 14 in., find XZ.  $\frac{4}{14} = \frac{20}{x}$ $4x = 280$ $x = 70$ $\boxed{XZ = 70}$
7.4 Applying Properties of Similar Triangles	
Use the Triangle Proportionality Theorem to solve for missing segments.	Solve for side LS.  $\boxed{LS = 12}$ Option 1: use △ proportionality Thm. (short cut) $\frac{8}{10} = \frac{x}{15}$ or $\frac{8}{x} = \frac{10}{15}$ $10x = 120$ $x = 12$ Option 2: use ~△'s (longer....) $\frac{8}{18} = \frac{x}{x+15} \rightarrow 18x = 8(x+15)$ $18x = 8x + 120$ $10x = 120$ $\boxed{x = 12}$

Use the Two Transversal Proportionality Corollary to find missing segments. // lines ÷ transversals Proportionally!	Find x.  $\frac{2}{5} = \frac{3}{x}$ $2x = 15$ $x = 7.5$
Use the Angle Bisector Theorem to find lengths of segments ∡ bisector ÷ sides of △ proportionally!	Given ∠ RVS ≅ ∠SVT , find ST  $\frac{8}{4} = \frac{10}{x}$ $8x = 40$ $x = 5$ $\boxed{ST = 5}$

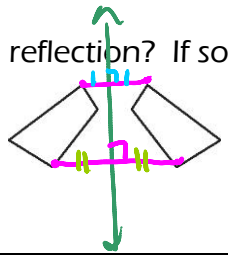
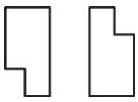
7.5 Using Proportional Relationships

Use ratios to make indirect measurements Use scale drawings to solve problems. Ratio of sides = ratio of perimeter (ratio of sides)^2 = ratio of area	▭ *PQRS* ~ ▭ *TUVW*. Find the perimeter and area of ▭ *TUVW*.  Ratio of sides $= \frac{21}{14} = \frac{3}{2}$ Perimeter $\frac{3}{2} = \frac{72}{P}$ $3P = 144$ $\boxed{P = 48\text{cm}}$ Area $\left(\frac{3}{2}\right)^2 = \frac{315}{A}$ $\frac{9}{4} = \frac{315}{A}$ $9A = 1260$ $A = 140\text{ cm}^2$ $\boxed{P = 48\text{cm} \quad A = 140\text{cm}^2}$

7.6 Dilations and similarity in the coordinate plane

Find points in a coordinate plane that partition a segment porportionally.	Given A(-2, -6) and B(1, 3) a) Find point P such that P divides the segment from A to B in the ration 1:5 $\frac{\text{Rise}}{\text{Run}} = \frac{9 \cdot 1/6}{3 \cdot 1/6} = \frac{1.5\uparrow}{.5\rightarrow}$ A(-2, -6) +.5 +1.5 $\boxed{P(-1.5, -4.5)}$  b) Find point Q such that Q divides the segment from A to B in the ratio 2:4 $\frac{\text{Rise}}{\text{Run}} = \frac{9 \cdot 2/6}{3 \cdot 2/6} = \frac{3\uparrow}{1\rightarrow}$ A(-2, -6) + 3, 1 $\boxed{P(1, -5)}$

Chapter 9: Transformations

What I Need to Know	Example
9.1 Reflections	
Identify a Reflection "flip" or "mirror image"	Is it a reflection? If so, draw the line of reflection. yes!   no