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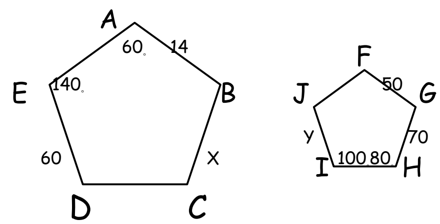
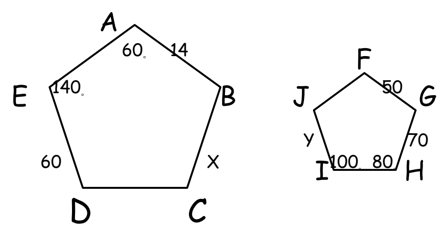
Geometry Journal: Similarity

Post, Thm, or Defn	Example/Drawing	Conclusion
1. **Definition of Similar Polygons**: A] corr∠'s ≅ B] Corr. sides proportional	**Given**: pentagon ABCDE ~ pentagon FGHIJ Find m∠F, m∠J, m∠B, x and y. 	m∠F = <u>60°</u> (corr. to ∠A) m∠J = <u>140°</u> (corr. ∠ E) m∠B = 540 - (140+60+100+80) = <u>160°</u> x = $\frac{14}{50} = \frac{x}{70}$ 980 = 50x **<u>19.6</u>** = x y = $\frac{14}{50} = \frac{60}{y}$ 3000 = 50y**<u>214.3</u>** = y
2. **Scale Factor**: ratio of corr. sides of similar polygons [must be simplified]	**Given**: pentagon ABCDE ~ pentagon FGHIJ 	$\frac{14}{50} = \frac{7}{25}$ **Scale factor**
3. **For ~ Polygons:** ratio of perimeters = scale factor [If one figure is 3 times larger than the other, the perimeters are also 3:1]	**Given** : above ~ pentagons If pentagon ABCDE has perimeter = 280 cm, what is the perimeter of pentagon FGHIJ?	$\frac{perimeter\ of\ small}{perimeter\ of\ large} = \frac{7}{25}$ $\frac{280}{x} = \frac{7}{25}$ **x = 1000 cm**
4. **For ~ Polygons:** ratio of areas = (scale factor)^2 (If the length of a rectangle is increased by a factor of 3 the area is increased by a factor of 9)	**Given** : 2 similar rectangles The area of the smaller is 120 cm^2, their widths have a ratio of 1:5, what is the area of the larger rectangle.	scale factor = $\frac{1}{5}$ $\frac{area\ small}{area\ large} = \left(\frac{1}{5}\right)^2$ $\frac{120}{x} = \frac{1}{25}$ area of large rectangle = 3000cm^2

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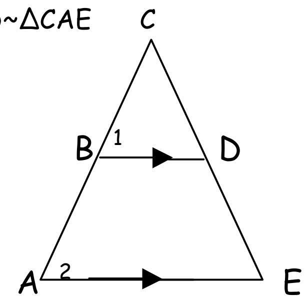
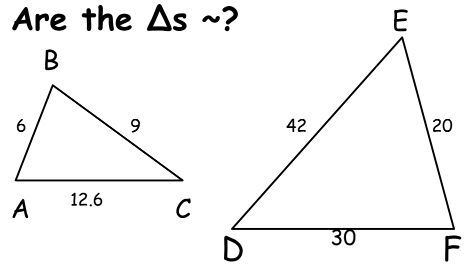
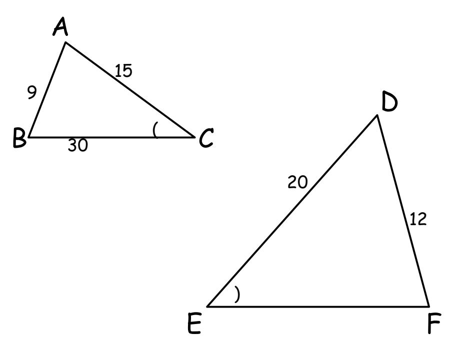
5. **For ~ Polygons:** ratio of volumes = (scale factor)^3 (If the radius of a cone is increased by a factor of 3, the volume is increased by a factor of 27 (3^3))	**Given**: 2 similar pyramids Their heights have a ratio of 3:2. The volume of the smaller pyramid is 450cm^3. Find the volume of the larger pyramid	**Scale factor** : $\frac{3}{2}$ so **volume ratio** : $\left(\frac{3}{2}\right)^3 = \frac{27}{8}$ $\frac{27}{8} = \frac{x}{450}$ 12150= 8x x = 1518.75 cm^3
6. **To prove 2 Δ's ~:** **AA~** (angle, angle, similarity) Find 2 pairs of ≅ ∠s	**Given**: BD //AE **Prove**: ΔCBD~ΔCAE 	A ∠C ≅∠C reflexive A ∠1≅∠2 // lines corr ∠s ≅ Δ CBD~ΔCAE AA~
7. **To prove 2 Δ's ~:** **SSS~** (side, side, side similarity) Find 3 pairs corresponding sides proportional - 3 ratios must be the same.	**Are the Δs ~?** 	**Check ratios:** $\frac{6}{20} = \frac{9}{30} = \frac{12.6}{42}$ 0.3 = 0.3 = 0.3 ΔABC ~ ΔEFD by SSS~
8. **To prove 2 Δ's ~:** **SAS~** (side, angle, side similarity) Find 2 pairs of proportional corr. sides with one pair of ≅ included angles. (2 ratios and ≅∠ between)	**Are ΔABC and ΔDEF ~?** 	For **SAS**: check ratios of sides S S A $\frac{9}{12} = \frac{15}{20}$ ∠E ≅ ∠C .75 = .75 given not inc. side **SO Δs are not ~.**

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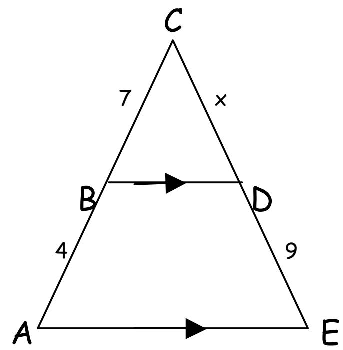
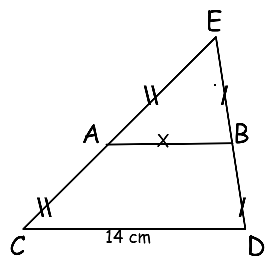
9. **Triangle Proportionality** If a segment is drawn // to the third side , then it cuts proportional segments.	 	$\frac{AB}{BC} = \frac{DE}{DC}$ $\frac{4}{7} = \frac{9}{x}$ 4x = 72 x = 18
10.The **mid-segment of a Δ, endpoints** are **midpoints** of 2 sides of a Δ, it is: 1] // to the third side 2] ½ length of the third side	 	$\overline{AB}$ // $\overline{CD}$ $\overline{AB}$ = 7 cm $\overline{AB}$ is the mid-segment of ΔCED
11.		
12		