Monday, January 7, 2013

Agenda

- No TISK or MM

- Lesson 7-1: Proportions

- Homework: Chapter 7 Packet 1 §7-1problems
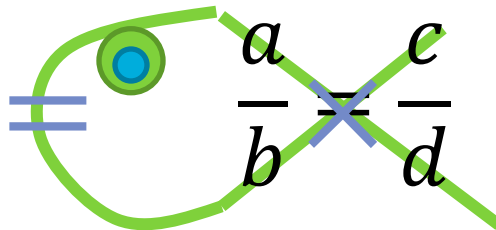
Please be ready to start taking notes after attendance is taken.

§7-1 Using Proportions

Equality of Cross Products Property

If b and d are nonzero then $\frac{a}{b} = \frac{c}{d}$ iff $ad = bc$.

I remembered this property as "Going Fishing":

Example 1. Solve the proportion.

$$\frac{3}{y} = \frac{5}{8}$$

$$8 \cdot 3 = y \cdot 5$$

$$24 = 5y$$

$$4\frac{4}{5} = y$$

$$\frac{x}{3} = \frac{12}{x}$$

$$x \cdot x = 3 \cdot 12$$

$$\sqrt{x^2} = \sqrt{36}$$

$$x = \pm 6$$

Only one minor issue comes up…

- Sometimes you get what are called _extraneous_ solutions.
- These are solutions that don't actually work.
- Example 2.   Solve the proportion:

$$\frac{y^2 - 9}{y + 3} = \frac{y - 3}{2}$$

Now check each solution in the original proportion…

$$2 \cdot (y^2 - 9) \quad = \quad (y + 3)(y - 3)$$

$$\frac{(-3)^2 - 9}{-3 + 3} = \frac{-3 - 3}{2}$$

$$2y^2 - 18 = y^2 - 9$$

$$-y^2 \qquad\qquad -y^2$$
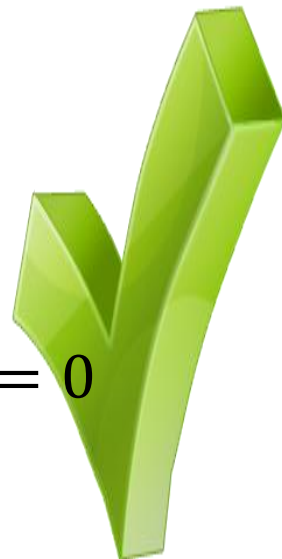
$$y^2 - 18 = -9$$

$$+18 \qquad +18$$

$$\frac{9 - 9}{0} = \frac{-6}{2}$$

$$\sqrt{y^2} = \sqrt{9}$$

$$y = \pm 3$$

$$y = 3$$

$$\frac{0}{0} = 3$$

$$0 = 0$$

When does this happen?

- When a denominator simplifies to 0…
- Try it out…
- Example 3. Solve the proportion:

$$-\frac{3}{d} = \frac{d-3}{2d} \qquad d \neq 0$$
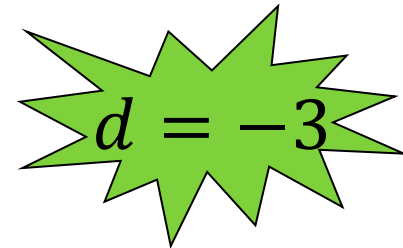
$$2d(-3) = d(d-3)$$

$$-6d = d^2 - 3d$$
$$+6d \qquad\qquad +6d$$
$$0 = d^2 + 3d$$
$$0 = d(d+3)$$
$$0 = d \text{ or } d = -3$$

$$d = -3$$

Corresponding Sides are Proportional

- ## If you're told that
  - ◦ Corresponding sides of polygon *ABCD* are proportional to the sides of polygon *WXYZ*, then how do you set up proportions?
  - ◦ $\dfrac{sides\ of\ ABCD}{sides\ of\ WXYZ} = \dfrac{perimeter\ ABCD}{perimeter\ WXYZ}$
  - ◦ Thus, $\dfrac{AB}{WX} = \dfrac{BC}{XY} = \dfrac{CD}{YZ} = \dfrac{AD}{WZ} = \dfrac{AB+BC+CD+AD}{WX+XY+YZ+WZ}$
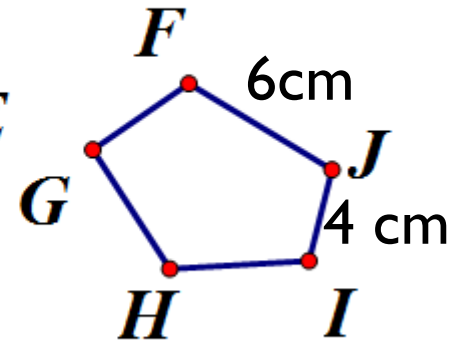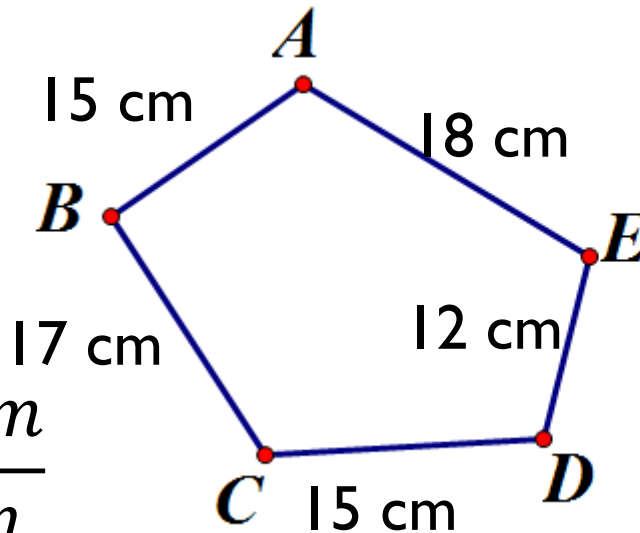
Example.

- Corresponding sides of polygon *ABCDE* are proportional to the sides of polygon *FGHIJ*. Find *FG*.

$$\frac{AB}{FG} = \frac{AE}{FJ}$$

$$\frac{15\ cm}{FG} = \frac{18\ cm}{6\ cm}$$

$$\frac{15\ cm}{FG} = \frac{3}{1}$$

$$15\ cm = 3FG$$

$$5\ cm = FG$$