Algebra 6-8: Proportions

Warm-Up

For each of the following size changes, fill in the chart. Find the size change factor (k) for the last two entries.

Size Change	Expansion, Contraction,or Neither ?	Rotated 180 degrees?
k=1	Neither	No
k=-1	Neither	Yes
k=.25	Contraction	No
k=-1.7	Expansion	Yes
(7,-2)→(3.5,-1) k = .5	Contraction	No
(-4,6)→(6,-9) k = -1.5	Expansion	Yes

K(-1)

7·K=3.5
K=3.5/7=.5

-4·K=6
K=6/-4=-1.5

Vocab	Definition	Example
Proportion	Two fractions set equal to each other	x/3=5/9
Means-Extremes Property	a/b = c/d; means; Extremes	bc = ad; means = extremes

Examples of Proportions	Non-Examples of Proportions
9/12=x/24 | 3/2=6/4	9/12 · x/24 | 2+x/3=1/5

Be consistent with units **!!! Use** labels **to help keep track!**

Examples

1. You can drive 100 miles on 5 gallons of gas. With the same gas mileage how far can you travel on 8 gallons of gas?

$\frac{100 \text{ mi}}{5 \text{ gal}} = \frac{x}{8 \text{ gal}}$ (miles)

$5x = 8 \cdot 100$

$\frac{5x}{5} = \frac{800}{5}$

$x = 160$ miles

2. You buy 3 apples for $0.60. How much does a dozen apples cost?

$\frac{3 \text{ apples}}{\$.60} = \frac{12 \text{ apples}}{x}$

$3x = 12(.60)$

$\frac{3x}{3} = \frac{7.20}{3}$

$x = \$2.40$

3. You are making punch that calls for 3 cups of soda and 2 cups of juice. You want to make a large amount of punch for a party. You have six, 20oz. (total 120 oz. or 15 cups) bottles of soda to use. How much juice do you need?

$\frac{3 \text{ cups soda}}{2 \text{ cups juice}} = \frac{15 \text{ cups of soda}}{x}$

$3x = 2 \cdot 15$

$\frac{3x}{3} = \frac{30}{3}$

$x = 10$ cups of juice

4. $\frac{x}{6} = \frac{4}{3}$

$\frac{24}{3} = \frac{3x}{3}$

$8 = x$

5. $\frac{2}{x} = \frac{4}{x-1}$

$4x = 2(x-1)$

$4x = 2x - 2$

$-2x \quad -2x$

$\frac{2x}{2} = \frac{-2}{2}$

$x = -1$

6. $\frac{2}{2-x} = \frac{8}{x-8}$

$2(x-8) = 8(2-x)$

$2x - 16 = 16 - 8x$

$+8x \quad +8x$

$10x - 16 = 16$

$+16 \quad +16$

$10x = 32$

$\frac{10x}{10} = \frac{32}{10}$

$x = 3.2$

7. $\frac{x}{9} = \frac{3}{x}$

$x \cdot x = 27$

$\sqrt{x^2} = \sqrt{27}$

$x = \pm 5.196$

$x \cdot x = x^2$

$2 \cdot x = 2x$

$1x + 1x = 2x$