Algebra 6-7: Size Changes

Warm-Up

1. 60% of what number is 130? 216.7

$.6(x) = 130$

$\frac{.6}{.6} \quad \frac{130}{.6}$

2. What percent of 50 is 29? 58%

$x(50) = 29$

$\frac{50}{50} \quad \frac{29}{50}$

$x = .58$

54.29

3. After a 30% sale, a pair of shoes cost $38. Find the original price of the shoes?

x = original

selling = original − discount

$38 = 1x - .30x$

$38 = .7x$

$\frac{38}{.7} \quad \frac{.7x}{.7}$

$128.57

4. After 5% tax, your new phone cost $135. Find the price of the phone before tax is added.

selling price = original + tax

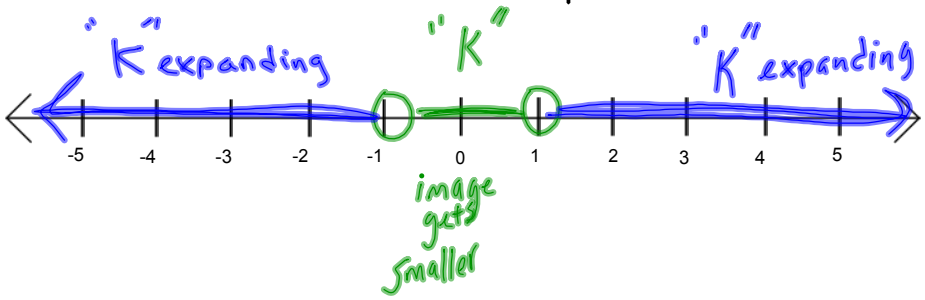
$135 = 1x + .05x$

$\frac{135}{1.05} = \frac{1.05x}{1.05}$

$x = 128.57$

- **Magnitude** is the same as a size change factor or scale factor
- The **k-value** determines whether the shape will shrink, enlarge, or stay the same.
- A **negative** size change factor rotates the shape 180° or flips it.
- A **positive** size change factor only enlarges or shrinks it.

Result	Definition	k value
Contraction	makes image smaller or shrinks it.	$-1 < K < 1$
Expansion	makes image bigger or enlarges it.	$K > 1$, $K < -1$
Neither	stays the same shape	$K = 1$, $K = -1$



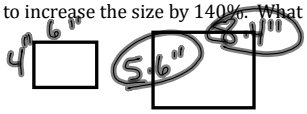
Examples

1. I have a photo that is 4" by 6". I want to increase the size by 140%. What are the new dimensions of my photo?

$K = 1.4$

$4 \times 1.4 = 5.6$

$6 \times 1.4 = 8.4$



2.

a. Graph triangle LMN which has the coordinates L (6, 3), M (-3, 0), and N (0, 3).

b. Draw its image under a size change of magnitude 2. Is this image an expansion, contraction, or neither?

$K = 2$

$L(6,3) \to (12,6)\ M(-3,0) \to (-6,0)$

$N(0,3) \to (0,6)$

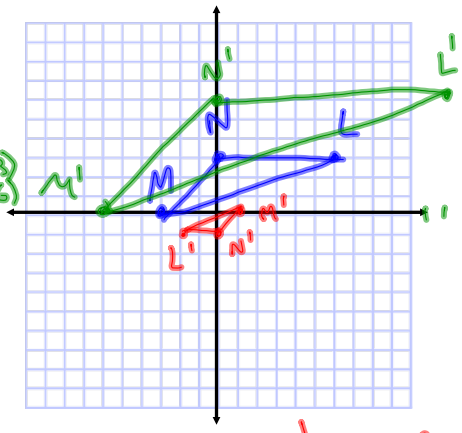
c. Draw its image under a size change of magnitude -1/3. Is this image an expansion, contraction, or neither?

$K = -\frac{1}{3}$

$L(6,3) \to (-2,-1)$

$M(-3,0) \to (1,0)$

$N(0,3) \to (0,-1)$



$\frac{6}{1} \cdot \frac{-1}{3} = \frac{-6}{3} = -2$ $\quad \frac{-3}{1} \cdot \frac{-1}{3} = \frac{3}{3} = 1$

$\frac{3}{1} \cdot \frac{-1}{3} = \frac{-3}{3} = -1$

3. Find the image of (4, -3) under a size change of magnitude -8.

$(-32, 24)$

$(4, -3) \to (-32, 24)$ image

$\times 8 \quad \times -8$

4. Under a size change of magnitude 10, the image of point P is (15, -45). What are the coordinates of P?

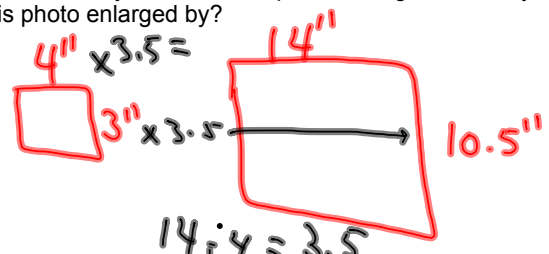
$(1.5, -4.5)$

$(1.5, -4.5) \to (15, -45)$ image

$\times 10 \quad \times 10$

$15 \div 10 \quad -45 \div 10 = -4.5$

5. You had a 4" by 3" wallet size photo enlarged to 14" by 10.5". By what percent was this photo enlarged by?



$14 \div 4 = 3.5$

$10.5 \div 3 = 3.5$

$3.5 = 350\%$