Cornell Notes	Name: KEY Date: _____
Main Ideas/Questions	Title of Notes: **Dilations**

Review: **Rigid Transformations**

Angle measure and ***distance*** (or lengths) are preserved.
Image is ***congruent*** to pre-image
Those we have studied are : Reflections
Rotations
Translations

Dilations:

- Transformations where ***angle measure*** is preserved, but ***distance is not.***
- NOT RIGID→ NOT ISOMETRIES K is the scale factor
- Represented by the equations
  (x,y) → (x', y') where x' = kx and y' = ky and *k* is constant
- Two types –contractions and expansions
- Fixed points-only at the origin

reduction

Reduction

A ~~***contraction***~~ reduces the original figure proportionally. *To create a* ~~***contraction***~~*, multiply the x-coordinate, y-coordinate, or both, by a number less than one but greater than zero.*

Reduction

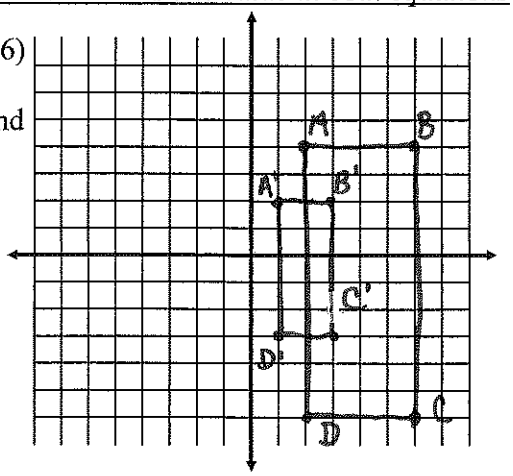
~~**Contractions**~~-when 0< k<1 Ex $x' = \frac{1}{2}x, y' = \frac{1}{2}y$

Reduction if scale factor < 1

*Notice **k** must be the same value in both equations*

Scale factor = $\frac{1}{2}$

1.Plot A(2,4) B(6,4) C(6,-6) D(2,-6)
2. Draw ABCD
3. Find the images of A, B,C, D and plot and draw them on the graph
A' (1, 2) B' (3, 2)
C' (3, -3) D' (1, -3)



4. Find the measure of each side.
AB 4 BC 10
CD 4 DA 10

A'B' 2 B'C' 5
C'D' 2 D'A' 5

5. What did you observe? $\frac{1}{2}$ as large (Reduction
6. Is the image congruent to the pre-image?
The image is $\frac{1}{2}$ the size of the pre-image

Cornell Notes	Name:_____ Date: _____
Main Ideas/Questions	enlargement Title of Notes: **Cont'd**

enlargement

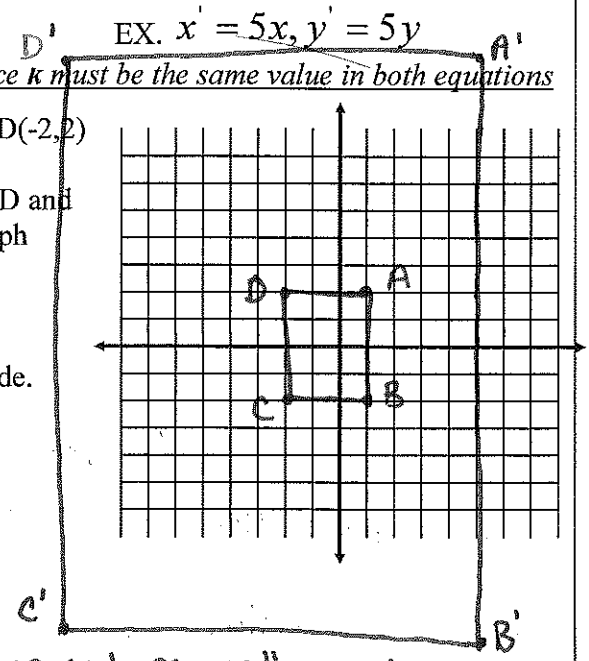
An ~~**expansion**~~ enlarges the original figure proportionally. *To create an* ~~**expansion**~~*, multiply both the x-coordinate and the y-coordinate by a number greater than one.*

Enlargement

~~**Expansions**~~-when k>1 EX. $x' = 5x, y' = 5y$

Notice k must be the same value in both equations

1.Plot A(1,2) B(1-2) C(-2,-2) D(-2,2)
2. Draw ABCD
3. Find the images of A, B,C, D and plot and draw them on the graph
A'(5,10) B'(5,-10)
C'(-10,-10) D'(-10,10)



Scale factor = 5

4. Find the measure of each side.
AB 4 BC 3
CD 4 DA 3

A'B' 20 B'C' 15
C'D' 20 D'A' 15

5. What did you observe?
The image was 5 times as large as the pre-image

6. Are there any fixed points? no
7. Is the image and pre-image congruent? no

Practice

Name the kind of transformation represented by each.

1. (x,y) → (5x, 5y) enlargement
2. (x,y) → (7x, 7y) enlargement
3. (x,y) → ((1/4)x, (1/4)y) reduction
4. (x,y) → ((2/5)x, (2/5)y) reduction

Find the image of the given point under the transformation described by x', y' → ((1/3)x ,(1/3)y)

5. (5,6) → $(\frac{5}{3}, 2)$ 6. (8,-12) → $(\frac{8}{3}, -4)$ 7. (0,0) → (0,0) 8. (-5,0) → $(\frac{-5}{3}, 0)$

9. What kind of transformation is done in #5-8? reduction

Find the image of the given point under the transformation described by f(x,y) = ((2/3)x, (2/3)y)

10. (6,6) → (4,4) 11. (9,0) → (6,0) 12. (-12, -3) → (-8,-2) 13. (a,b) → $(\frac{2}{3}a, \frac{2}{3}b)$

14. What kind of transformation is done in #10-13?

Cornell Notes Main Ideas/Questions	Name:_____ Date: _____ Title of Notes: **Stretches and Shrinks (Distortions)**

Review: Isometries are when the pre-image and image are congruent and three types are rotations translations, reflections.

Dilations: two types are enlargement & reduction

Some transformations are neither isometries nor dilations. *When neither size (segment measures) nor shape (angle measures) is preserved then the transformation is called a* **DISTORTION.**

Four Types of Distortions

for y

I. **Vertical Stretch:** represented by the rule
- $(x,y) \rightarrow (x,ky)$ where $k>1$
- Only the y-values change
- Fixed points are on the x-axis

Scale factor > 1

II. **Vertical Shrink:** represented by the rule,
- $(x,y) \rightarrow (x,ky)$, where $0<k<1$
- Only the y-values change
- Fixed points are on the x-axis

Scale factor < 1

for x

III. **Horizontal Stretch**: represented by the rule,
- $(x,y) \rightarrow (kx,y)$, where $k>1$
- Only the x - values change
- Fixed points are on the y -axis.

Scale factor > 1

IV. **Horizontal Shrink:** represented by the rule,
- $(x,y) \rightarrow (kx,y)$, where $0<k<1$
- Only the x-values change.
- Fixed points on the y -axis.

Scale factor < 1

Practice:

Name the kind of transformation represented in each.

1. $(x,y) \rightarrow (2x,y)$ horizontal stretch 2. $(x,y) \rightarrow (x,\frac{1}{4}y)$ vertical shrink

3. $(x,y) \rightarrow (.3x,y)$ horizontal shrink 4. $(x,y) \rightarrow (x,\frac{4}{3}y)$ vertical stretch