

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
 $(x,y) \rightarrow (x', y')$ where $x' = kx$ and $y' = ky$ and k is constant
- Two types –contractions and expansions
- Fixed points–only at the origin

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

Reduction

Reduction if scale factor < 1

Scale factor = 1/2

Contractions–when $0 < k < 1$

Ex $x' = \frac{1}{2}x, y' = \frac{1}{2}y$

Notice k must be the same value in both equations

1. Plot A(2,4) B(6,4) C(6,-6) D(2,-6)

2. Draw ABCD

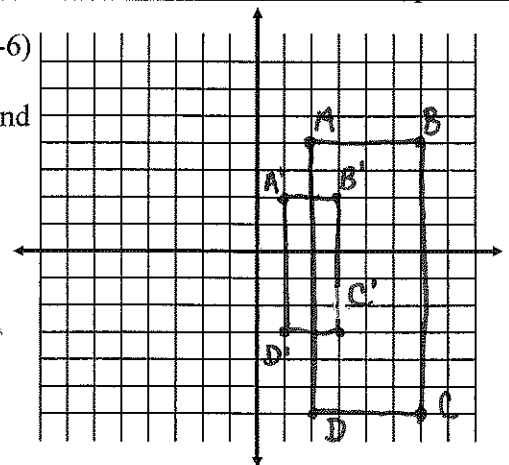
3. Find the images of A, B, C, D and plot and draw them on the graph

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? *1/2 as large (Reduction)*

6. Is the image congruent to the pre-image?

The image is 1/2 the size of the pre-image

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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)

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. $(x,y) \rightarrow (5x, 5y)$ *enlargement*

2. $(x,y) \rightarrow (7x, 7y)$ *enlargement*

3. $(x,y) \rightarrow ((1/4)x, (1/4)y)$ *reduction*

4. $(x,y) \rightarrow ((2/5)x, (2/5)y)$ *reduction*

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

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

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

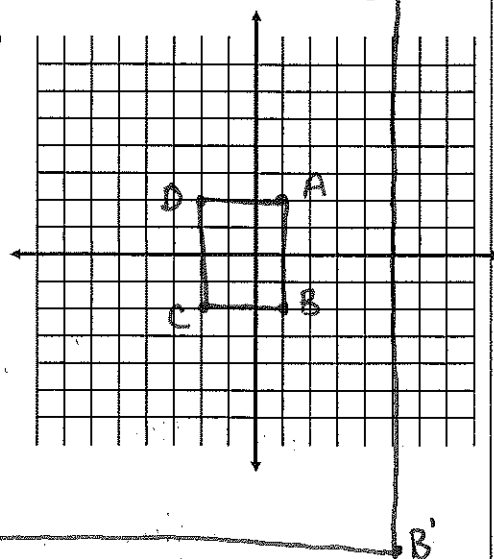
Find the image of the given point under the transformation described by $f(x,y) = ((2/3)x, (2/3)y)$

10. $(6,6) \rightarrow (4, 4)$ 11. $(9,0) \rightarrow (6, 0)$ 12. $(-12, -3) \rightarrow (-8, -2)$

$(a,b) \rightarrow (\frac{2}{3}a, \frac{2}{3}b)$

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

Scale factor = 5



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Main Ideas/Questions

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

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

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

for y

for x

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. This is essential for ensuring the integrity of the financial statements and for providing a clear audit trail.

2. The second part of the document outlines the various methods used to collect and analyze data. These methods include direct observation, interviews, and the use of statistical models. Each method has its own strengths and limitations, and it is important to choose the most appropriate one for the specific research objectives.

3. The final part of the document discusses the ethical considerations that must be taken into account when conducting research. This includes issues such as informed consent, confidentiality, and the potential for harm to participants.