

January 7, 2019 Monday

Translate a square (1,1) (3,1) (3,3) (1,3) using the rule $\leftarrow x - 4, y + 1 \rightarrow$ then reflect the square across the x-axis.

pre-image

image

Jan 4-2:35 PM

P 80 Rules for Rotation

Review: Translate
Reflection
New: Rotate

The table summarizes rules for rotations on a coordinate plane.

Rules for Rotations Around the Origin on a Coordinate Plane	
90° rotation counterclockwise	$(x, y) \rightarrow (-y, x)$
180° rotation	$(x, y) \rightarrow (-x, -y)$
270° rotation counterclockwise	$(x, y) \rightarrow (y, -x)$
360° rotation	$(x, y) \rightarrow (x, y)$

maps to "rule"

Aug 7-10:05 AM

Rotations

A rotation is: an isometry (the figure maintains the same shape & angles) that moves either clockwise (CW) or counterclockwise (CCW)

Rotations in the Coordinate Plane

A rotation is 'clockwise' if $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or 'counterclockwise' if $\begin{pmatrix} a & b \\ -c & -d \end{pmatrix}$

Original Point $P = (x, y)$

Rotated 90° around the origin $P' = (-y, x)$

Rotated 180° around the origin $P'' = (-x, -y)$

Rotated 270° around the origin $P''' = (y, -x)$

Rotation about the Origin

$R_{90}(x, y) = (-y, x)$ $R_{180}(x, y) = (-x, -y)$ $R_{270}(x, y) = (y, -x)$

Graph triangle GHI on the grid and rotate it 90°, 180°, and 270°.

$G = (1, 1)$ $H = (4, 6)$ $I = (5, 1)$

$G' = (-1, 1)$ $H' = (-6, 4)$ $I' = (-1, 5)$

$G'' = (-1, -1)$ $H'' = (-4, -6)$ $I'' = (-5, -1)$

$G''' = (1, -1)$ $H''' = (4, -6)$ $I''' = (5, -1)$

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Practice

1. Graph triangle BCD on the grid.

$B = (-2, -5)$ $C = (3, -1)$ $D = (6, -3)$

Rotate the triangle 180° about the origin.

List the new points.

$B' = (2, 5)$

$C' = (-3, 1)$

$D' = (-6, 3)$

2. Graph the following about and it's rotation.

$S = (-2, 1)$ $S' = (2, 1)$ $T = (-1, 3)$ $T' = (1, 3)$ $U = (-4, 5)$ $U' = (4, 5)$

$S'' = (-1, -2)$ $S''' = (1, -2)$ $T'' = (-3, 2)$ $T''' = (3, 2)$ $U'' = (-5, 4)$ $U''' = (5, 4)$

Identify the degree of rotation.

How do you know this is the correct degree?

Because they switch sides because $(x, y) \rightarrow (-y, x)$

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Geometry Name _____ ID: 1

Rotations Class Practice

Write a rule to describe each transformation.

1) 90° CW

2) 180°

3) 270° CW

4) 90° CCW

Graph the image of the figure using the transformation given.

5) rotation 90° clockwise about the origin

6) rotation 180° about the origin

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Geometry Name _____ ID: 1

Rotations Class Practice

Write a rule to describe each transformation.

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2) 180°

3) 270° CW

4) 90° CCW

Graph the image of the figure using the transformation given.

5) rotation 90° clockwise about the origin

6) rotation 180° about the origin

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January 8, 2019 Tuesday 'SG'

Translate point $(3, -5)$ using rule $(x - 5, y + 2)$. Write the ordered pair for the image.

$(3 - 5, -5 + 2)$
 $(-2, -3)$

Aug 7-10:05 AM

What is symmetry?

Mathematically, **symmetry** means that one shape becomes exactly like another when you move it in some way: turn, flip or slide. For two objects to be **symmetrical**, they must be the same size and shape, with one object having a different orientation from the first. There can also be **symmetry** in one object, such as a face. Jun 9, 2015

Both Vertical & Horizontal lines of symmetry
www.math-only-math.com

Examples	Non-examples

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Lines of symmetry...

Point of Symmetry - where multiple lines of symmetry intersect. Pos

LoS Lines of Symmetry - the figure evenly folds on its self.

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Date: _____ Name: _____

A figure has a **line of symmetry**, if it can be folded along a line so that the two halves match.
 A figure has a **point of symmetry**, if it is a midpoint of all segments between the preimage and image points.

Determine how many lines of symmetry each figure has. Then determine whether the figure has point symmetry.

Group 2-3 # 2, 3, 6

1. 4 LoS, 1 Pos
 2. 2 LoS, 1 Pos
 3. 1 LoS, 0 Pos
 4. 5 LoS, 1 Pos
 5. 2 LoS, 1 Pos
 6. No LoS, No Pos
 7. 1 LoS, 0 Pos
 8. 1 LoS, 0 Pos
 9. 1 LoS, 0 Pos

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SYMMETRY

- Complete the pictures below, by reflecting them in the mirror line (im) gives. Some pictures have more than one mirror line.
- Flatten a piece of paper and draw a line of symmetry (mirror line).
- In one corner, draw a design or pattern or an object. The pattern must have 2 axes of symmetry.

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Look at the letters of our alphabet below. Organize the letters according to which ones have reflection symmetry into three groups: the letters that have reflective symmetry with a vertical line of symmetry (like the letter A), those with a horizontal line of symmetry, and those with both vertical and horizontal lines of symmetry.

V.S. H.S.

Letters with Vertical Symmetry: A, M, T, U, V, W, Y

Letters with Horizontal Symmetry: B, C, D, E, K

Does not have symmetry: F, G, L, P, Q, R, S, Z

Triangle ABC has vertices A(0, 4), B(2, 1), and C(4, 3). Find the coordinates of the vertices of ABC after a reflection over the y-axis. Do this first. Then graph the figure and its reflected image.

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ROTATIONAL SYMMETRY
 A shape has rotational symmetry if its only form has at least three in one turn. The order of rotational symmetry is the number of times the shape fits onto itself in one turn. A 2D shape has a line of symmetry if a line divides the shape into two halves - one being the mirror image of the other.
 Write the order of rotational symmetry under each shape & letter. Also draw dotted lines to indicate lines of symmetry.

M A T H S
 M A T H S

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January 9, 2019 Wednesday

Draw an image that has one or more lines of symmetry.
 Draw an image that has no lines of symmetry.

Aug 10-7:59 AM

Odd, even or neither functions

Andy Wain, describe an even, odd, and neither function

mathbyfives, even, odd, neither symmetry by looking @

even, odd, or neither functions

...be ready to share what you have learned.

Andy → $f(x) = x^3 + x^1$ (odd) | $f(x) = |x^0 - x^4$ (even) | $f(x) = 2x^2 - x^4$ (neither)

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Even, Odd, or Neither

$f(x) = x^2 + 6$ (Even) | $f(x) = x^3 - 8x$ (Odd) | $f(x) = x^4 + 3x^2$ (Neither)

$f(x) = f(x)$ (Even) | $f(-x) = -f(x)$ (Odd) | $f(-x) \neq f(x)$ (Neither)

Even and Odd Functions (algebraically)
 A function is even if $f(-x) = f(x)$
 If you plug in -x and get the original function, then it's even.
 A function is odd if $f(-x) = -f(x)$
 If you plug in -x and get the opposite function, then it's odd.

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Even & Odd Functions

Geometrically:
 A function is even if y-axis symmetry exists.
 A function is odd if rotational symmetry around the origin exists.

Algebraically:
 A function is even if $f(-x) = f(x)$
 A function is odd if $f(-x) = -f(x)$
 A function is neither if $f(-x) \neq f(x)$ and $f(-x) \neq -f(x)$

Using the exponents, determine if each function is even, odd or neither:
 $f(x) = x^2 - x^2$ (Neither) | $f(x) = -x^2 + 2x^1$ (Odd) | $f(x) = x^2 + 4x^1 + 1$ (Neither)
 $f(x) = \frac{1}{2}x^4 + 9x^2$ (Even) | $f(x) = 5x^3 + 1$ (Neither) | $f(x) = 5x^3$ (Even)

Can a linear function ever be even or odd? If so, sketch an example: $f(x) = x$

Can an exponential function ever be even or odd? If so, sketch an example.

If the following points are on an odd function, what other points are on the function? Give the coordinates.

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Geometry 2.2 Even and Odd Functions

We can classify the graphs of functions as either even, odd, or neither.
 If we cannot classify a function as even or odd, then we call it neither!

Directions: Determine graphically using possible symmetry, whether the following functions are even, odd, or neither.

1. 2. 3. 4. 5. 6.

To verify algebraically if a function is even, odd, or neither, we must prove one of the following.
 For even prove: $f(-x) = f(x)$ For odd prove: $f(-x) = -f(x)$
 If neither of the above are true, we call the function neither!

Function Notation	What to do	Example
$f(x)$	Repeat the original function.	$f(x) = x^2 + 3x + 5$
$f(-x)$	Plug in a $-x$ for every x and simplify!	$f(x) = -x^2 + 3x + 5$

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$-f(x)$ Change every sign you see in $f(x) = x^2 + 3x + 5$
 Yes. If something starts positive, it changes to negative and if it starts negative, it changes to positive.

Directions: Verify exponentially whether each function is even, odd, or neither!

1. $f(x) = -6x$




2. $g(x) = x^4 - 2x^2$




3. $h(x) = x^2 + 2x + 1$

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Even, Odd, or Neither Worksheet Name: _____

Determine whether the following functions are even, odd, or neither.

1. $f(x) = 4x - 3$  2. $f(x) = |x| + 1$  3. $f(x) = -x^2 - 4$ 

4. $f(x) = \frac{1}{3}x^2$  5. $f(x) = 7x$  6. $f(x) = \sqrt{x+5}$ 

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7. $f(x) = 3x^2$ 8. $f(x) = x^2 - 2$ 9. $f(x) = 3x + 4$

10. $f(x) = x^2 - 5$ 11. $f(x) = 10x + 5$ 12. $f(x) = 2(x+1)^2$

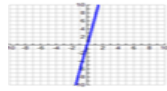
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January 10, 2019, Thursday

Are the following even, odd, or neither?

7. $f(x) = 3x^3$
 even

$f(x) = 7x$
 odd



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Review for Test

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January 11, 2019, Friday

Graph the image of the figure using the transformation given.

1) translation: 3 units right and 4 units down
 $(x, y) \rightarrow (x+3, y-4)$

2) reflection across the y-axis

3) rotation 180° about the origin
 $(x, y) \rightarrow (-x, -y)$

4) Write the equation for an even function $f(x) = x^2$

5) Write the equation for an odd function $f(x) = x^3$

6) Identify 3 letters from the alphabet that have vertical symmetry.
 A, M, O

no x-y grids...just a rough sketch for 1 - 3!

...test

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