QUIZ DATE: _____ & _____ TEST DATE: _____

Math 2 Name _____

Unit 2 – Quadratic Functions Date _____ Pd ____

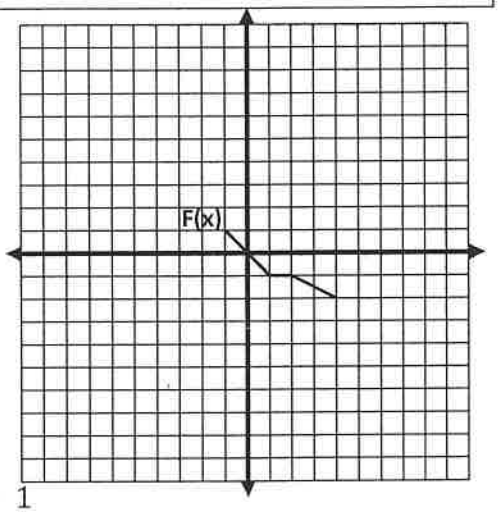
Lesson 1 – Transformations

➢ Review:

- A Relation is any set of ordered pairs.
- Domain: set of all x values in a relation
- Range: set of all y values in a relation
- A Function is a relation in which each element of the domain is paired with exactly one element of the range.
- Graphically, a function must pass the Vertical line test (VLT) in order to be classified as a function.

➢ Examine the graph of $F(x)$ to the right:

x	$F(x)$
−1	1
1	−1
2	−1
4	−2



1. Is $F(x)$ a function? Why or why not?
2. What is the domain of $F(x)$?
3. What is the range of $F(x)$?
4. Evaluate each of the following key points on $F(x)$:

$F(1) =$ −1 $F(-1) =$ 1 $F($ 4 $) = -2$ $F($ −1 $) = 1$

x y x y

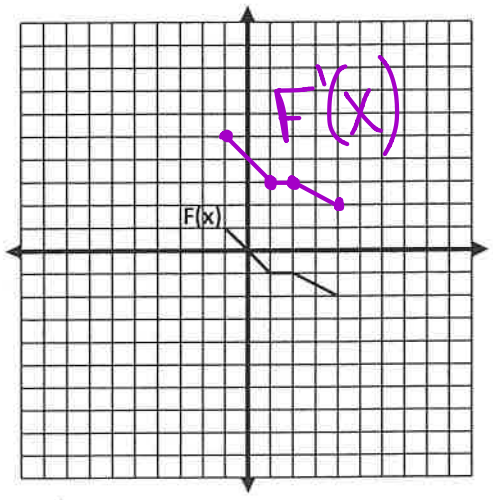
❖ Remember that $F(x)$ is another name for the **y-values** → the equation of the function is $y = F(x)$.

➢ Now let's try graphing: $y = F(x) + 4$.

➢ Complete the table below for this new function and then graph on the coordinate.

x	y	+4
−1	1	5
1	−1	3
2	−1	3
4	−2	2

up 4



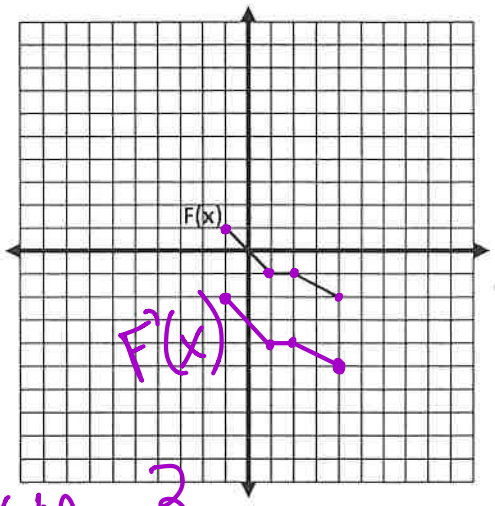
Describe the transformation: Translate up 4

Did the transformation affect the domain or the range of the function? Range

➢ Graph: $y = F(x) - 3$.

x	y
−1	
1	
2	
4	

down 3



Describe the transformation: Translate

Did the transformation affect the domain or the range of the function? Range

down 3

❖ **Checkpoint**: Describe the affect for the following functions.

Equation	Effect to the graph
Example: $y = F(x) + 18$	Translate up 18 units
1. $y = F(x) - 10$	D 10
2. $y = F(x) + 3$	U 3
3. $y = F(x) + 32$	U 32
4. $y = F(x) - 1$	D 1

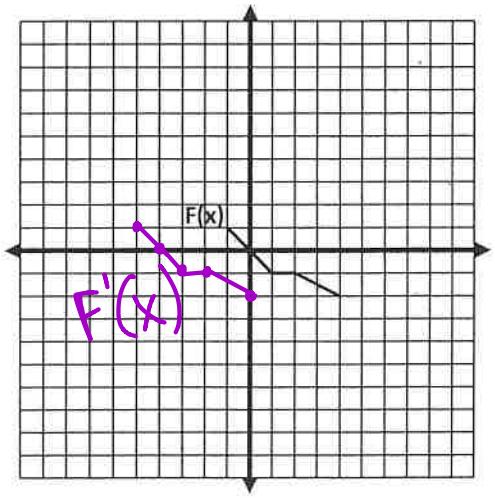
➢ Graph: $y = F(x + 4)$.

inside ( )

L 4 opp.

Describe the transformation: translate left 4

Did the transformation affect the domain or the range of the function? Domain



➢ Graph: $y = F(x - 3)$.

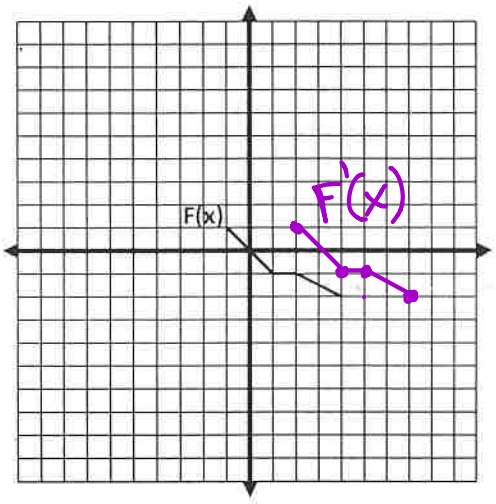
R 3

Describe the transformation:

Translate Right 3

Did the transformation affect the domain or the range of the function?

Domain



$f(x) = f(x \mp k) \pm q$

$+$ L $-$ R $+$ U $-$ D

❖ **Checkpoint**: Describe the affect for the following functions.

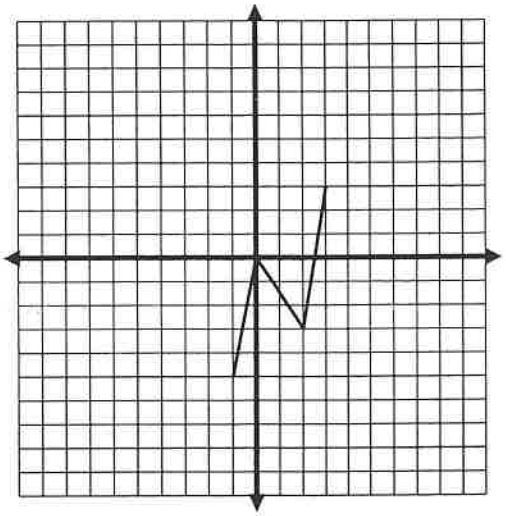
Equation	Effect to the graph
Example: $y = F(x + 18)$	Translate left 18 units
1. $y = F(x - 10)$	" R 10
2. $y = F(x) + 7$	" U 7
3. $y = F(x + 48)$	" L 48
4. $y = F(x) - 22$	" D 22
5. $y = F(x + 30) + 18$	" L 30 / U 18

❖ **Checkpoint**: Write the equation for each translation:

Equation	Effect to the graph
Example: $y = F(x + 8)$	Translate left 8 units
1. $y = f(x) + 29$	Translate up 29 units
2. $y = f(x - 7)$	Translate right 7
3. $y = f(x + 45)$	Translate left 45
4. $y = f(x + 5) + 14$	Translate left 5 and up 14
5. $y = f(x - 6) - 2$	Translate down 2 and right 6

➢ Now let's look at a new function.
Its notation is $H(x)$.

x	$H(x)$



1. What are the key points?
(List them in the chart)

2. Describe the effect on the graph for each of the following.

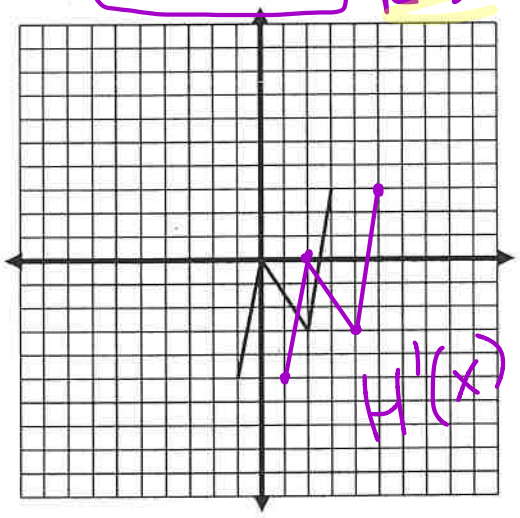
a. $H(x-2)$ R 2

b. $H(x)+7$ U 7

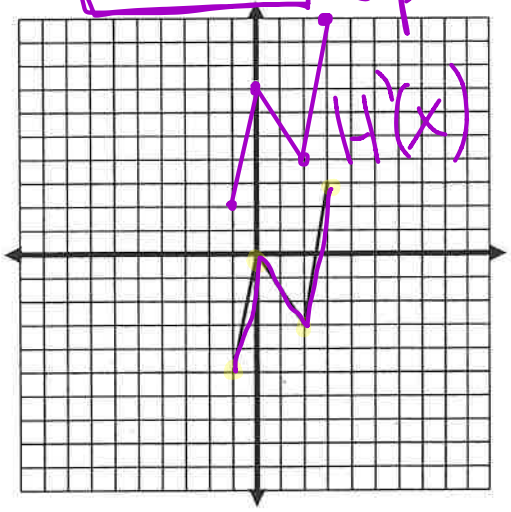
c. $H(x+2)-3$ L 2 D 3

3. Use your answers to questions 1 and 2 to help you sketch each graph *without using a table*.

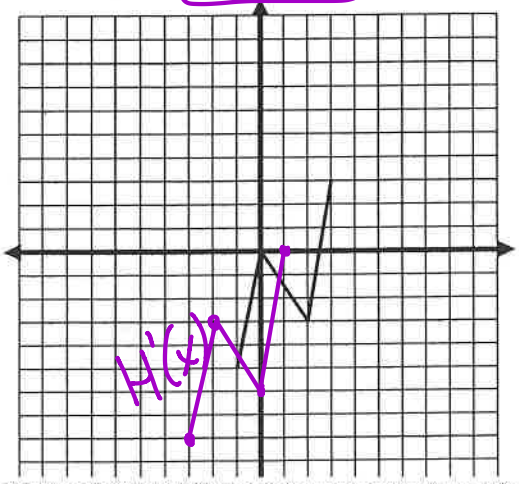
a. $y = H(x-2)$ R 2



b. $y = H(x)+7$ UP 7



c. $y = H(x+2)-3$ L 2 D 3



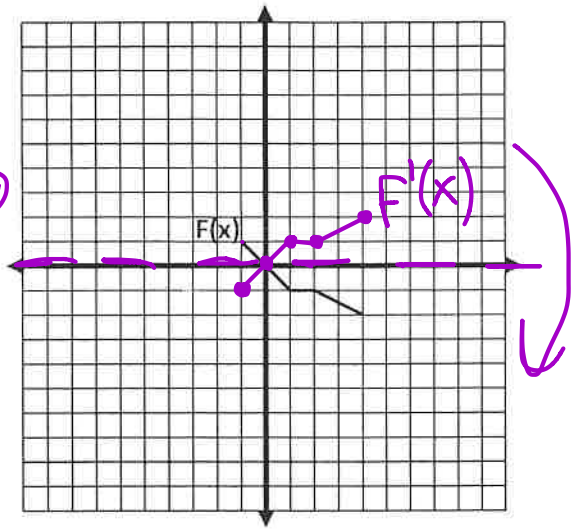
OVHIO
Outside Vertical Horizontal Inside Opposite

Recall that the equation: $y = F(x)$

➢ Now let's graph: $y = -F(x)$

$(x, y) \rightarrow (\quad)$ reflection

Rx-axis



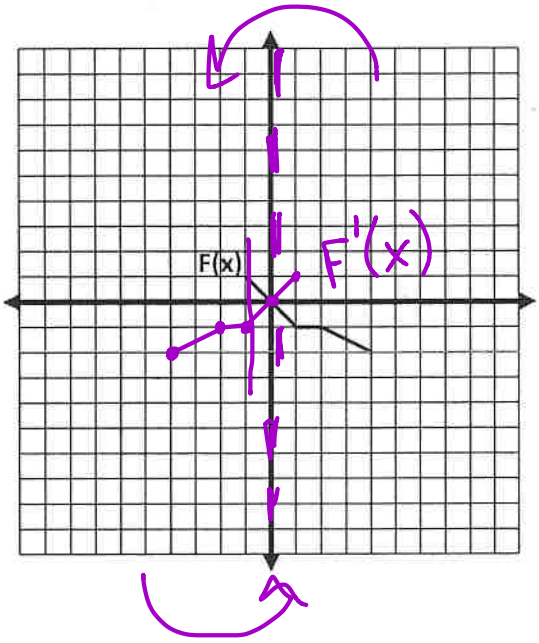
Describe the transformation: Rx-axis

Did the transformation affect the domain or the range of the function? Range

OVHIO

➢ Now let's graph: $y = F(-x)$

$(x, y) \rightarrow (\quad)$

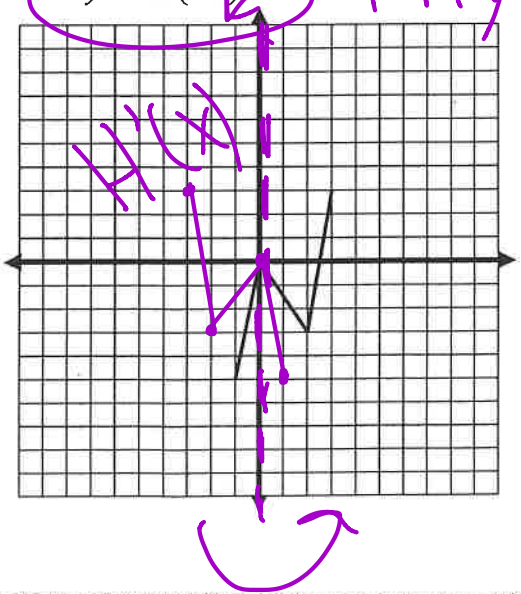


Describe the transformation: Ry-axis

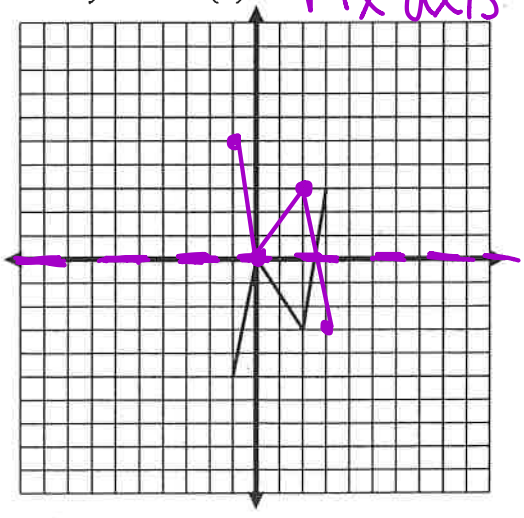
Did the transformation affect the domain or the range of the function? Domain

❖ **Checkpoint:** $H(x)$ **is shown on each grid.**
Graph without making a table

1. $y = H(-x)$ Ry-axis



2. $y = -H(x)$ Rx-axis



Math 2
Unit 2 – Quadratic Function
Lesson 2 – Transformations Continued

Name_____
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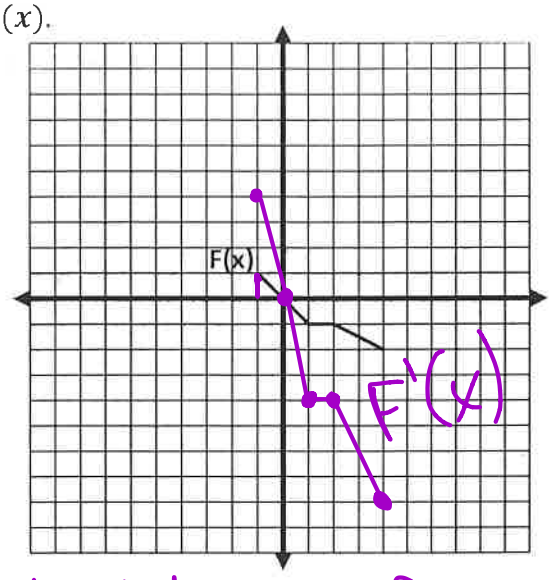
➢ Now let's return to the function whose equation is $y = F(x)$.

Complete the chart with the key points.

x	$F(x)$
-1	$1 \times 4 = 4$
1	$-1 \times 4 = -4$
2	$-1 \times 4 = -4$
4	$-2 \times 4 = -8$



➢ Let's suppose that $y = 4F(x)$ Dilate, stretch by scale factor of 4

$(x, y) \rightarrow$ ( )

Describe the transformation:
Stretch by S.F. of 4

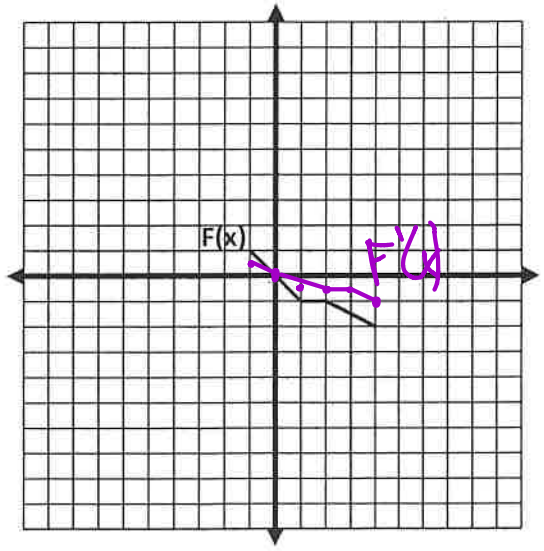
Did the transformation affect the domain or the range of the function?
Range

➢ Graph: $y = \frac{1}{2}F(x)$. $-1 < x < 1$

$(x, y) \rightarrow$ ( )

Describe the transformation:
Compress by S.F. $\frac{1}{2}$

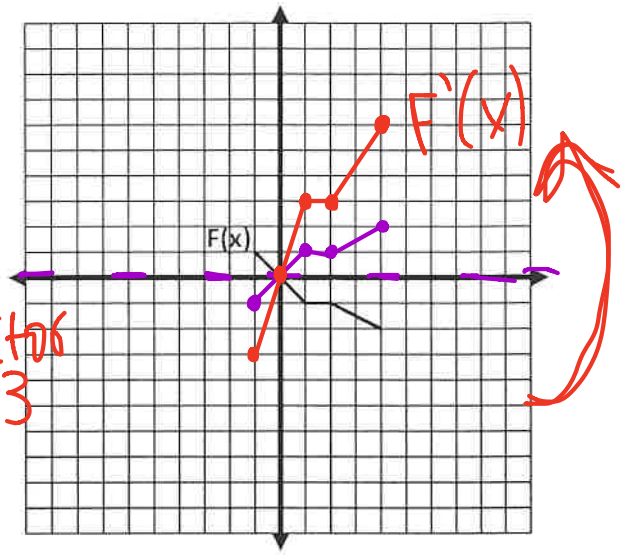
Did the transformation affect the domain or the range of the function?



1) Rx-axis 2) S by 3

➢ Graph: $y = -3F(x)$.

$(x, y) \rightarrow$ ( )



Describe the transformation:

1) Rx-axis

a) Dilate; Stretch by scale factor of 3

Did the transformation affect the domain or the range of the function?

Range

➢ **Checkpoint: Let's revisit $H(x)$.**

1. Describe the effect on the graph for each of the following.

Example: $-5H(x)$ Each point is reflected in the x-axis and is 5 times as far from the x-axis.

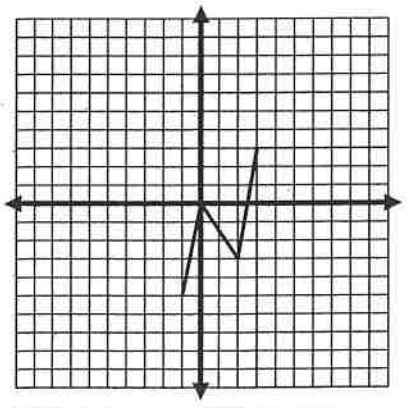
a. $3H(x)$ _____

b. $-2H(x)$ _____

c. $\frac{1}{2}H(x)$ _____

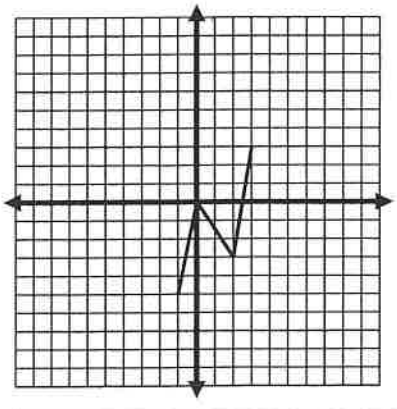
2. Sketch each graph *without using a table*.

a. $y = 3H(x)$



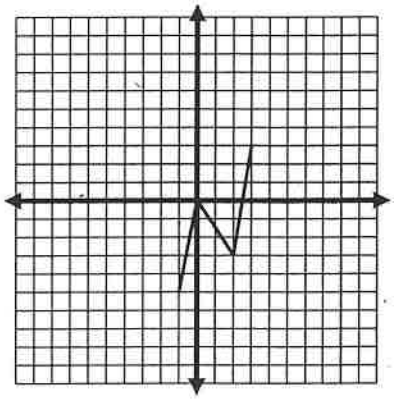
$(x, y) \rightarrow$ ( )

b. $y = -2H(x)$



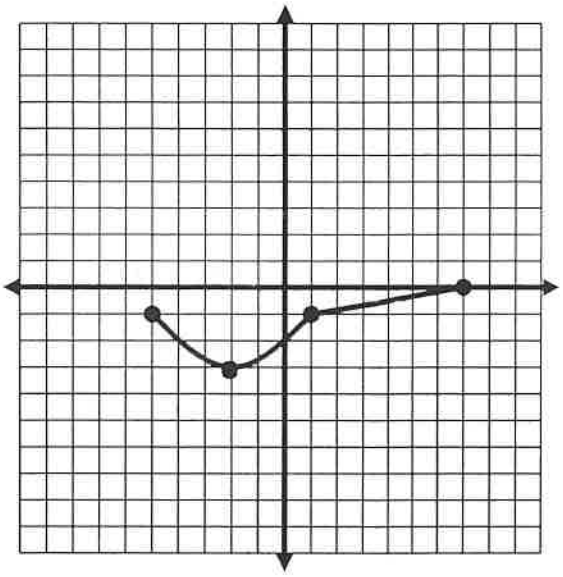
$(x, y) \rightarrow$ ( )

c. $y = \frac{1}{2}H(x)$



$(x, y) \rightarrow$ ( )

➢ Graph: $y = -D(x) - 4$

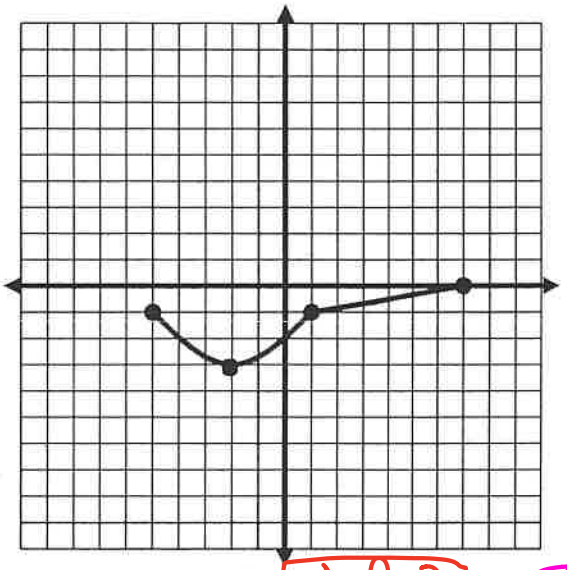


1. List the transformations needed to sketch the graph.
   (Remember, to be careful with order.)
   - _____
   - _____

2. Plot the new points and sketch the graph.

3. $(x, y) \rightarrow$ ( )

➢ Graph: $y = 3D(-x)$



1. List the transformations needed to sketch the graph.
   (Remember, to be careful with order.)
   - _____
   - _____

3. Plot the new points and sketch the graph.

3. $(x, y) \rightarrow$ ( )

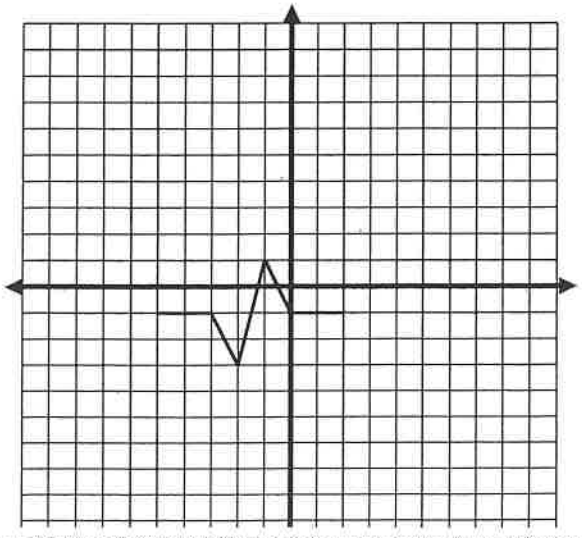
1) R 3

2) Rx-axis outside

3) D6

➢ **Checkpoint:**

1. Graph: $y = 3C(x) + 5$



2. Graph: $y = -G(x - 3) - 6$