Warm Up

State the transformations to the following functions:

$$y = 3(x - 4)^2 \qquad\qquad y = -2(x + 1)^2 + 5$$

VS factor of 3

HT right 4

Reflection in x-axis

VS factor of 2

HT left 1

VT up 5

Transformations

Lesson objectives

- I know how to identify the Horizontal Stretch/Compression/Reflection
- I know how to graph the transformations to a quadratic
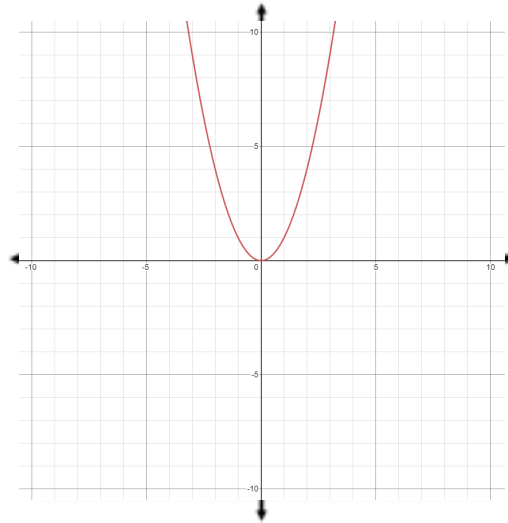
1.1

| Lesson objectives | Teachers' notes | Lesson notes |

Complete the HW Handout
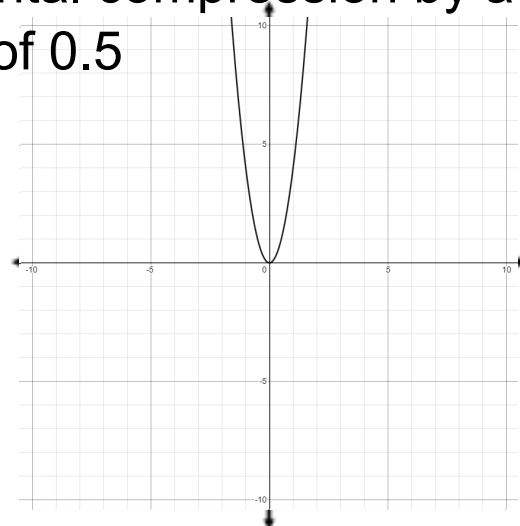
1. $g(x) = x^2$ Transformations: _____NONE_____

x	y
-2	4
-1	1
0	0
1	1
2	4

2. $g(x) = (2x)^2$ Transformations: _____

Horizontal compression by a factor of 0.5

x	y
-2	16
-1	4
0	0
1	4
2	16

3. $f(x) = (4x)^2$ Transformations:_____

Horizontal compression by a factor of 0.25

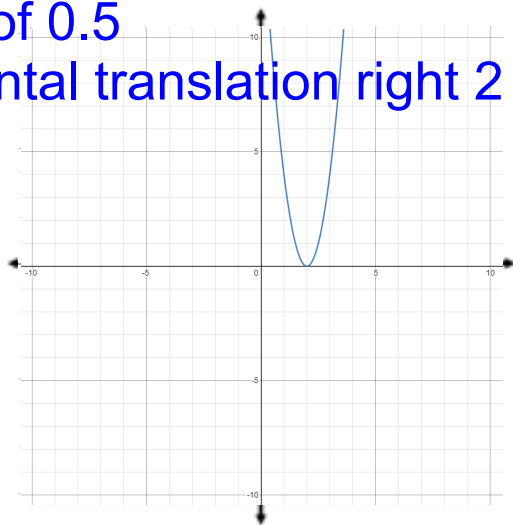| x	y
-2	64
-1	16
0	0
1	16
2	64
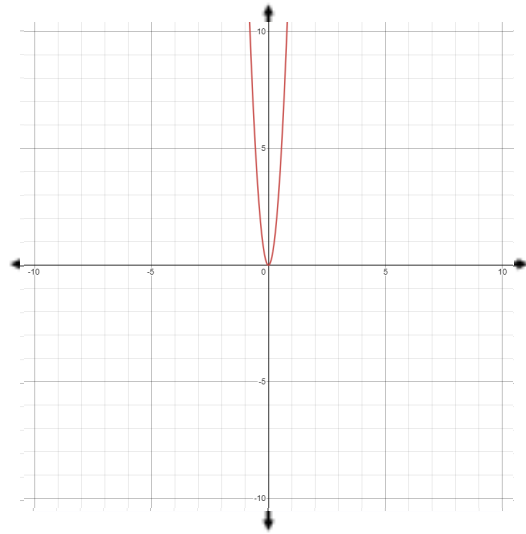
4. $h(x) = (-2(x-2))^2$ Transformations:_____

Reflection in the y-axis
Horizontal compression by a factor of 0.5
Horizontal translation right 2

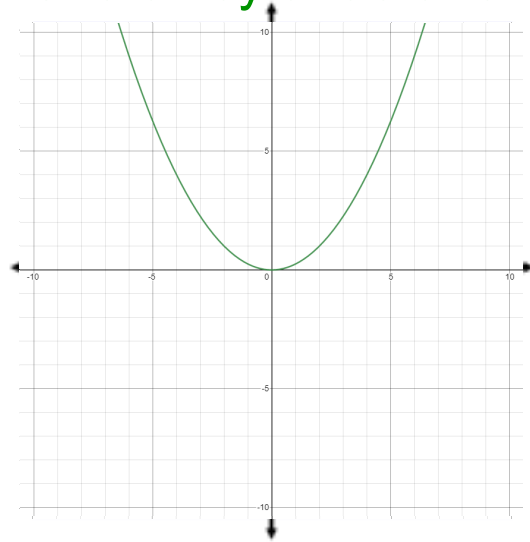| x	y
-2	64
-1	36
0	16
1	4
2	0

5. $g(x) = (0.5x)^2$ Transformations:_____

Horizontal stretch by a factor of 2

x	y
-4	4
-2	1
0	0
2	1
4	4

6. $g(x) = (0.1x)^2$ Transformations:_____

Horizontal stretch by a factor of 10

x	y
-10	1
-5	0.25
0	0
5	0.25
10	1
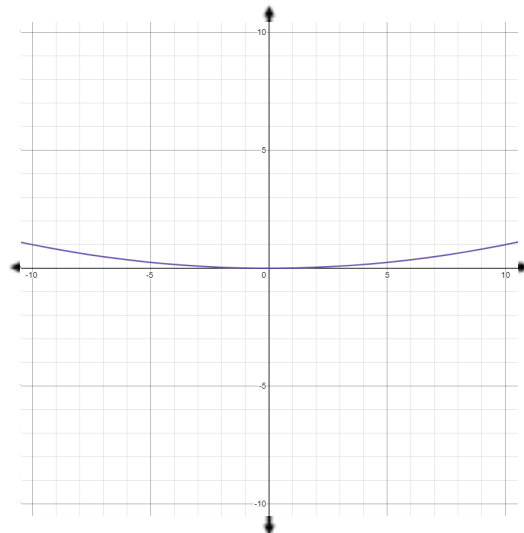
Summary:

When we introduce the new transformation we change the letters in our equation

$$y = a(k(x - d))^2 + c$$

Where k controls the horizontal stretch/compression/reflection.

k: Horizontal Stretch/Compression/Reflection

|k|>1: horizontal compression by a factor of 1/k

$$y = 3(-2x - 4)^2 + 1$$

0<|k|<1: horizontal stretch by a factor of 1/k

$$y = 3(-2(x + 2)^2 + 1$$

k<0: horizontal reflection in the y-axis

- The transformations inside the brackets are horizontal

- The transformations outside the brackets are vertical

Example

Transforming the coordinates of a Point:

Apply the horizontal transformations to the x value and apply the vertical transformation to the y value.

***Remember BEDMAS**

Ex: Find the transformed coordinates of the point $(2,-3)$ for the equation $y = 3(-1(x - 2))^2 - 4$

original point   (2   ,   -3)

÷ -1   x 3

+ 2   - 4

transformed point (0   ,   -13)

x: ⟶ x/k + d

y: ⟶ a(y) + c