

QUADRATIC FUNCTION TRANSFORMATIONS

Step-by-Step Graphing & Analysis Worksheet

Student Name: _____

Date: _____

Period: _____

PARENT FUNCTION BASELINE: $F(X) = X^2$

All quadratic transformations stem from the parent graph $y = x^2$ with vertex at $(0, 0)$. Standard Vertex Form: $y = a(b(x - h))^2 + k$

x	-2	-1	0	1	2
$y = x^2$	4	1	0	1	4

PART 1: Transformations on the y-axis (Vertical Shifts)

GUIDED EXAMPLE

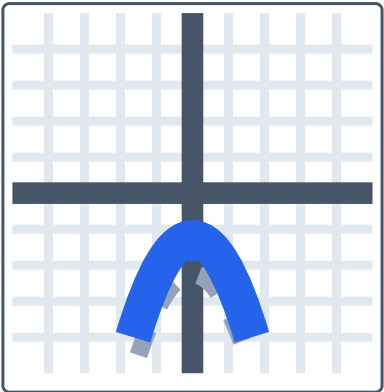
Graph $y = x^2 - 3$

Step 1 (Identify Shift): Shift down by 3 units ($k = -3$).

Step 2 (Vertex): New vertex is at $(0, -3)$.

Step 3 (Table): Subtract 3 from parent y-values.

x	-2	-1	0	1	2
y	1	-2	-3	-2	1



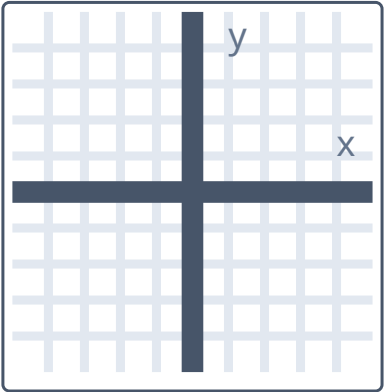
Problem 1: Graph $y = x^2 + 2$

a. Shift direction & amount: _____

b. Vertex location: (_____ , _____)

c. Complete Table & Plot:

x	-2	-1	0	1	2
y					

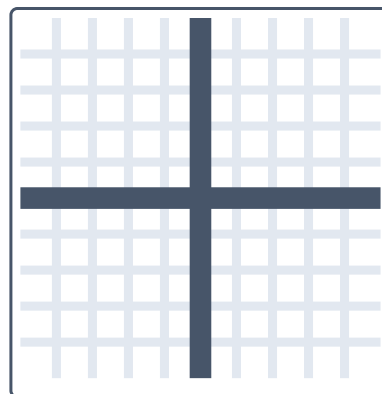


PART 2: Transformations on the x-axis (Horizontal Shifts)

Problem 2: Graph $y = (x + 3)^2$

- a. Shift direction & amount: _____
- b. Vertex location: (_____ , _____)
- c. Calculate key points:

x	-5	-4	-3	-2	-1
y					

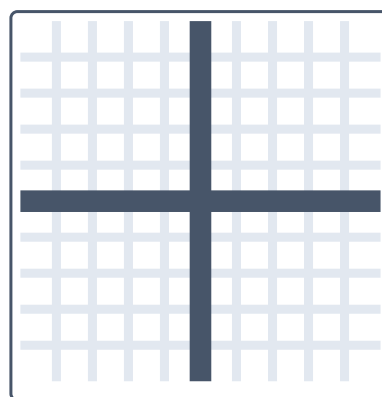


PART 3: Combined Shifts (Both Axes)

Problem 3: Graph $y = (x - 1)^2 - 4$

- a. Horizontal Shift: _____
- b. Vertical Shift: _____
- c. Vertex (h, k) : (_____ , _____)
- d. Complete Table:

x	-1	0	1	2	3
y					

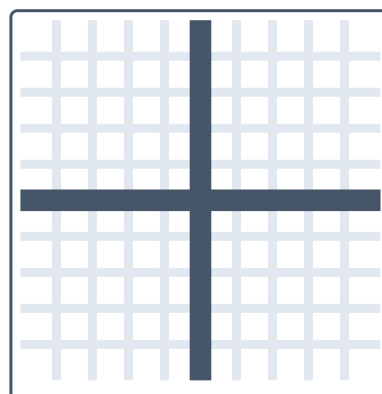


PART 4: Reflections across Axes

Problem 4: Graph $y = -(x + 2)^2 + 1$

- a. Parabola Opens: [] Upwards [] Downwards
- b. Vertex (h, k) : (_____ , _____)
- c. Describe all transformations:

x	-4	-3	-2	-1	0
y					



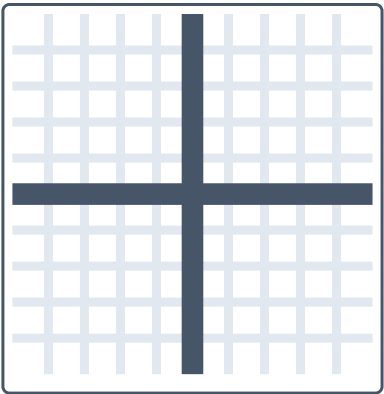
PART 5: Vertical & Horizontal Stretches / Compressions

Problem 5: Graph $y = 2x^2$ (Vertical Stretch)

a. Transformation type: _____

b. Is graph wider or narrower than $y = x^2$?

x	-2	-1	0	1	2
y					

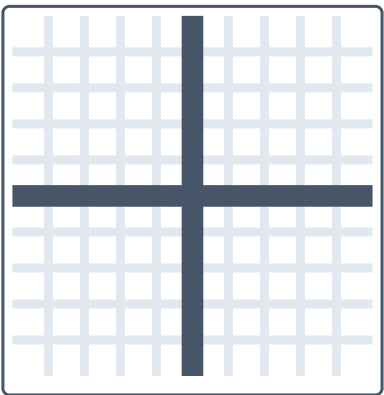


Problem 6: Graph $y = \frac{1}{2}x^2$ (Vertical Compression)

a. Transformation type: _____

b. Scale factor applied to y-values: _____

x	-4	-2	0	2	4
y					



PART 6: Master Challenge (All Transformations)

Problem 7: Graph $y = -2(x - 3)^2 + 8$

Step 1 (Vertex): $(h, k) = (\quad , \quad)$

Step 2 (Reflection): Over x-axis? _____

Step 3 (Stretch/Compress): Factor of _____

Step 4 (Table of Values):

x	1	2	3	4	5
y					

