

Graphing Quadratic Functions

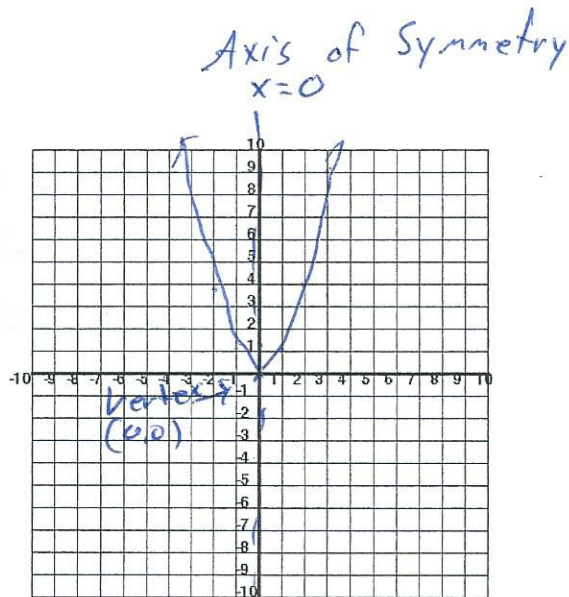
- 1) Complete the following table for the function given below and sketch the points and connect the dots with a smooth curve. Answer the questions that follow using page 236.

$$y = x^2$$

Graph:

Table:

X	-6	-4	-2	0	2	4
Y	36	16	4	0	4	16



- a) What is a parabola?
It is the graph of a quadratic or 2nd degree. It's U-shaped
- b) What is a vertex?
The highest or lowest point of the parabola
- c) What is an axis of symmetry?
A vertical line that cuts the parabola in half.
It is always $x = x\text{-coordinate of vertex}$
- d) Pinpoint these items on the graph you made

Notes Section:

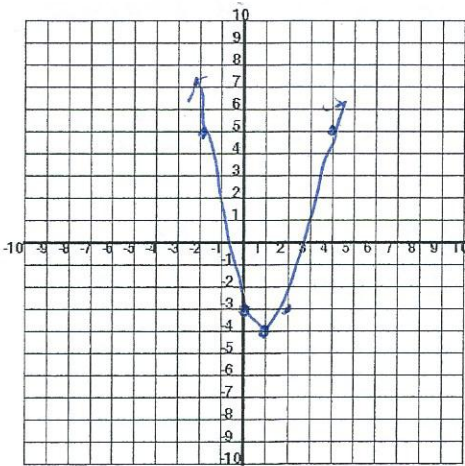
Standard form of a quadratic function is given by: $y = ax^2 + bx + c$

For each of the questions below complete the tables and sketch the graphs

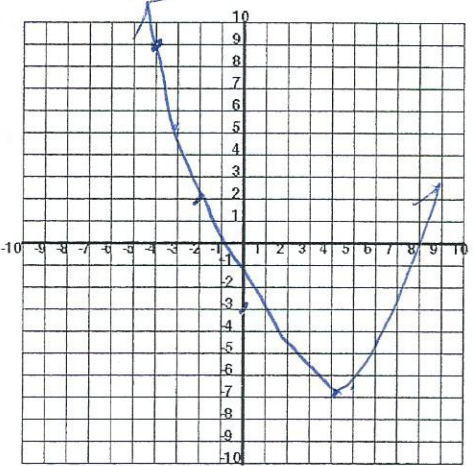
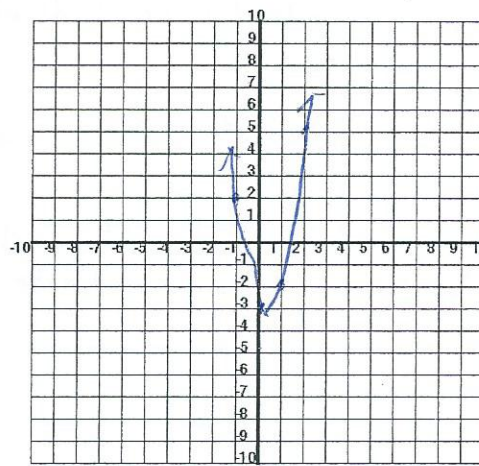
2) Complete the tables, graphing the functions and answer the questions.

Input value	Output $y = x^2 - 2x - 3$	Output $y = 3x^2 - 2x - 3$	Output $y = (1/4)x^2 - 2x - 3$
-4	21	53	9
-2	2 5	13	2
0	0 -3	-3	-3
2	-3	5	-6
4	5	37	-7

graph $y = x^2 - 2x - 3$



Graph $y = 3x^2 - 2x - 3$ Graph $y = \frac{1}{4}x^2 - 2x - 3$



How did changing the a-value to a number greater than one affect the graph?

Makes it skinnier

How did changing the a-value to a number between zero and one affect the graph?

Makes it wider

Is the vertex of each of these graphs a maximum output or a minimum output?

Minimums

What is the y-intercept of each of these graphs? Where do you see that number in each function?

(0, -3)

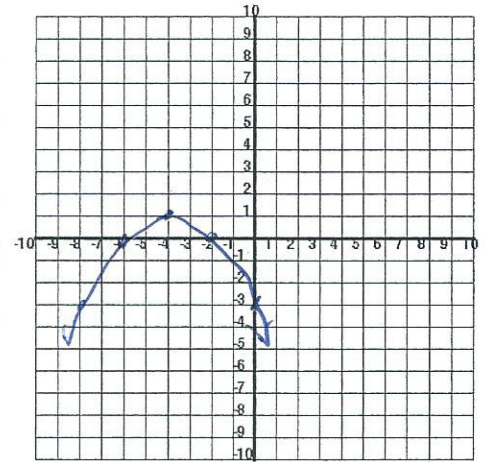
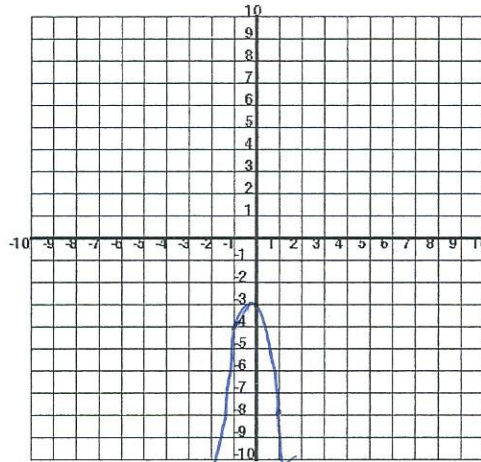
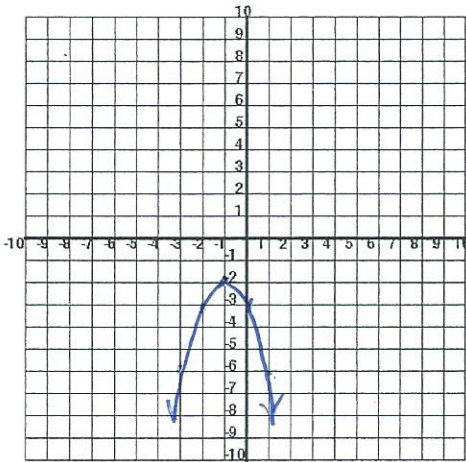
3) Complete the tables, graphing the functions and answer the questions.

Input value	Output $y = -x^2 - 2x - 3$	Output $y = -3x^2 - 2x - 3$	Output $y = -(1/4)x^2 - 2x - 3$
-4	-11	-43	1
-2	-3	-11	0
0	-3	-3	-3
2	-11	-19	-8
4	-27	-59	-15

graph $y = -x^2 - 2x - 3$

Graph $y = -3x^2 - 2x - 3$

Graph $y = -\frac{1}{4}x^2 - 2x - 3$



How did making the a-value of each function affect the graphs?

flipped upside down

Is the vertex of each of these graphs a maximum output or a minimum output?

minimum

What is the y-intercept of each of these graphs? Where do you see that number in each function?

(0, -3)

4) For each function below before you graph it identify the A,B, and C values. Then use those values to predict whether the function will open up or down, whether the function will be wider or narrower than $y = x^2$, what the y-intercept will be, and will the vertex be a maximum or a minimum value. Then graph the function to confirm your predictions.

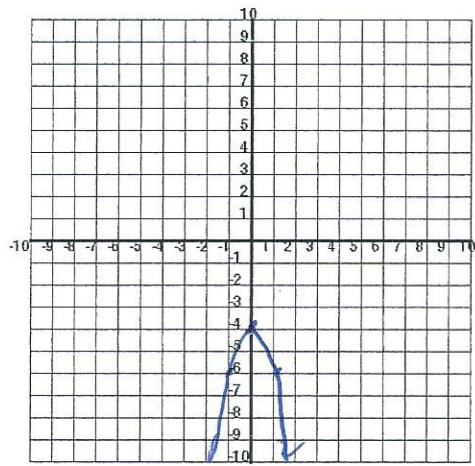
a) $y = -2x^2 - 4$ A: -2 B: 0 C: -4

Does it open up or down? down

Wider or narrower than $y = x^2$? Narrower

What is the y-intercept? (0, -4)

Is the vertex a maximum or a minimum? Max



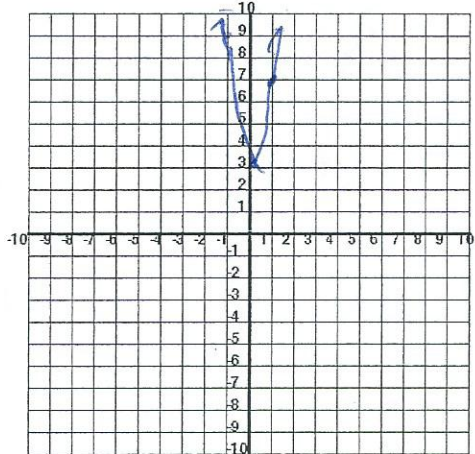
b) $y = 5x^2 - x + 3$ A: 5 B: -1 C: 3

Does it open up or down? up

Wider or narrower than $y = x^2$? narrower

What is the y-intercept? 0,3

Is the vertex a maximum or a minimum? min



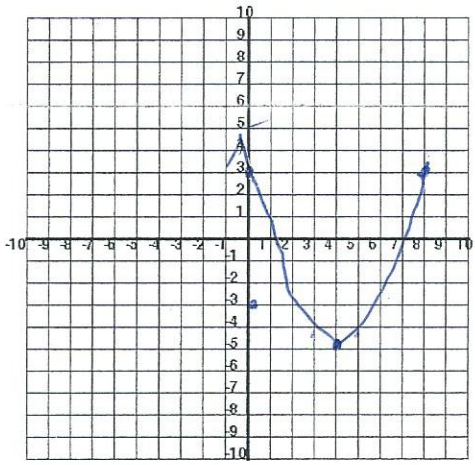
c) $y = (0.5)x^2 - 4x + 3$ A: .5 B: -4 C: 3

Does it open up or down? up

Wider or narrower than $y = x^2$? wider

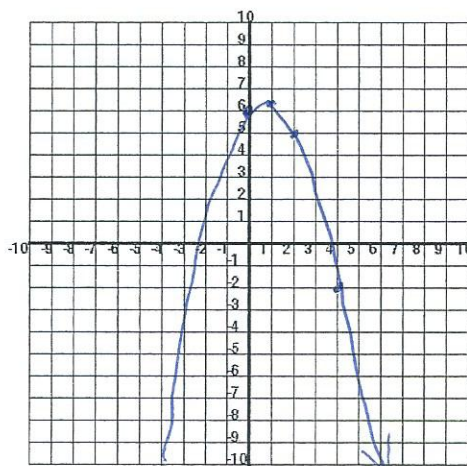
What is the y-intercept? (0, 3)

Is the vertex a maximum or a minimum? min



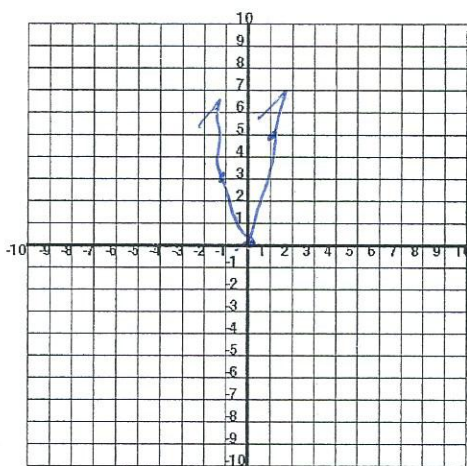
d) $y = \left(\frac{-3}{4}\right)x^2 + x + 6$ A: $-\frac{3}{4}$ B: 1 C: 6

Does it open up or down? down
Wider or narrower than $y = x^2$? wider
What is the y-intercept? (0,6)
Is the vertex a maximum or a minimum? Max



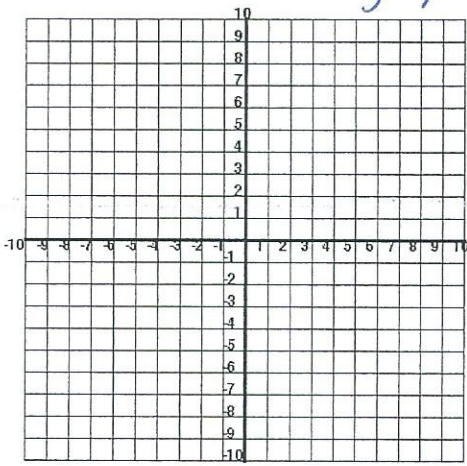
e) $y = 4x^2 + x$ A: 4 B: 1 C: 0

Does it open up or down? up
Wider or narrower than $y = x^2$? narrower
What is the y-intercept? (0,0)
Is the vertex a maximum or a minimum? min



e) $y = (.01)x^2 + 3.45x - 0.5$ A: .01 B: 3.45 C: -0.5

Does it open up or down? up
Wider or narrower than $y = x^2$? wider
What is the y-intercept? (0, -0.5)
Is the vertex a maximum or a minimum? min



graph not big enough