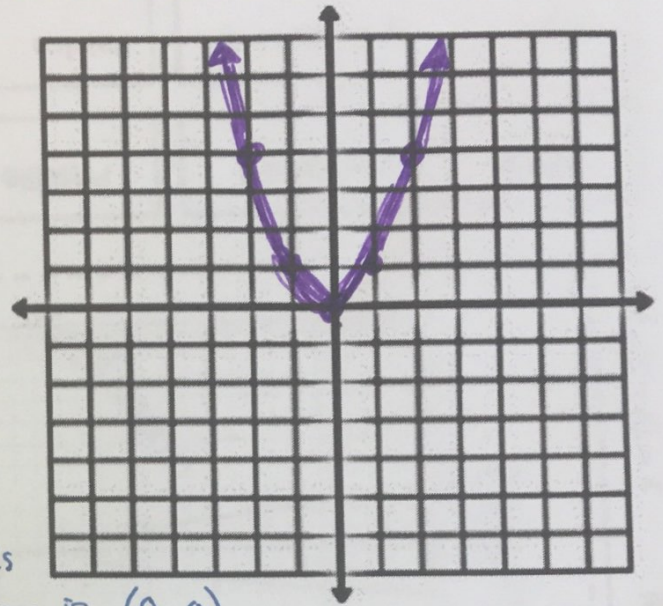


Another Parent Function: Meet Pete, $P(x) = x^2$ Parabola

Characteristic points:

X	Y = F(x)
-2	4
-1	1
0	0
1	1
2	4

$P(-2) = (-2)^2$
 $P(-1) = (-1)^2$
 $P(0) = (0)^2$



Domain and Range:
 (x-values) (y-values)

D: $(-\infty, \infty)$ R: $[0, \infty)$

Features:

- Vertex: the lowest or highest values on a graph * Pete's vertex is (0,0)
- Leading coefficient: # out in front * Pete's is 1
 \Rightarrow Pete is a parabola opening upward

Pete's Children:

1.) $y = (x - 5)^2 + 4$

Transformations:

Translate right 5
 Translate up 4

2.) $y = -2x^2$

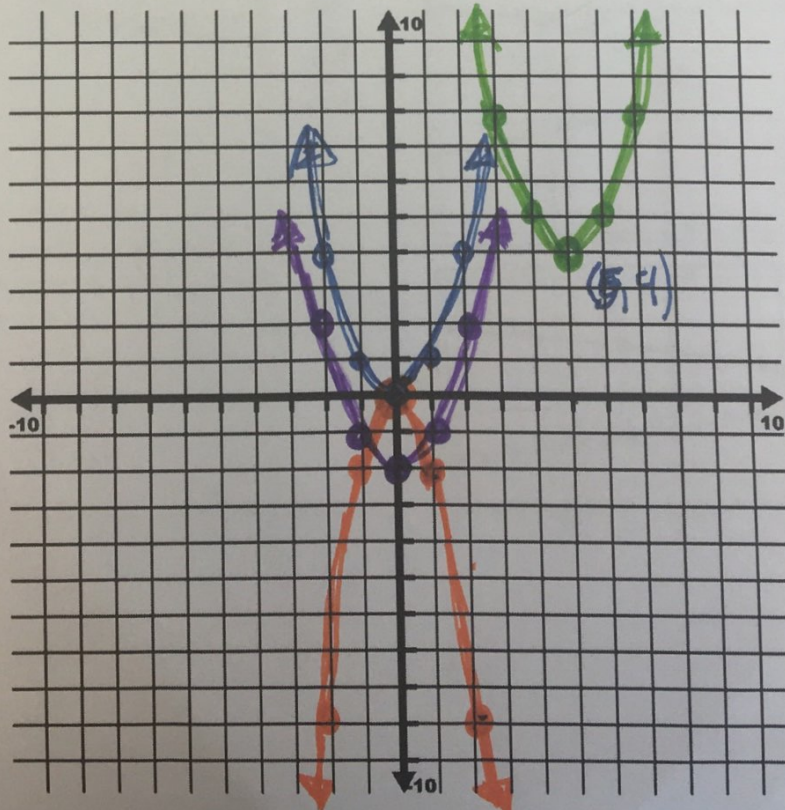
Transformations:

Reflect over x-axis
 Vertical stretch

3.) $y = (-x)^2 - 2$

Transformations:

Reflect over y-axis
 Translate down 2.



Writing Quadratic Equations from a Vertex

Sleuth: Keyz

Detectives! We have a missing functions report! Last week, we looked at three children of Pete $P(x)$. From their function notations, we were able to list transformations and graph their characteristic points. But now some of poor Pete's progeny have disappeared! The only traces we have left is a few of their points. Help to figure out who has gone missing.

List of possible lost functions:

Parker $y = -x^2 + 4$

Priscilla $y = -3x^2 + 6$

Pearl $y = -2x^2 - 5$

Poe $y = (x - 4)^2$

Patrice $y = 2(x - 5)^2 - 6$

Paquita $y = -(x + 4)^2$

Poisson $y = (x + 1)^2 + 1$

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

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

Pablo $y = (x + 2)^2$

Pontius $y = (x + 4)^2$

Pascal $y = (x - 5)^2 - 6$

Portia $y = -(x - 2)^2$

Example: Here's our first missing function.

Step 1.) To begin figuring out who this function is, we'll have to look for some clues. We'll start by looking at the vertex. This will tell us any transformations that our unknown function has undergone. What is the vertex of this parabola?

$(-1, 1)$

Step 2.) Pete the parent function's vertex is located at the origin $(0, 0)$. List the translations that would move the point $(0, 0)$ to this function's vertex.

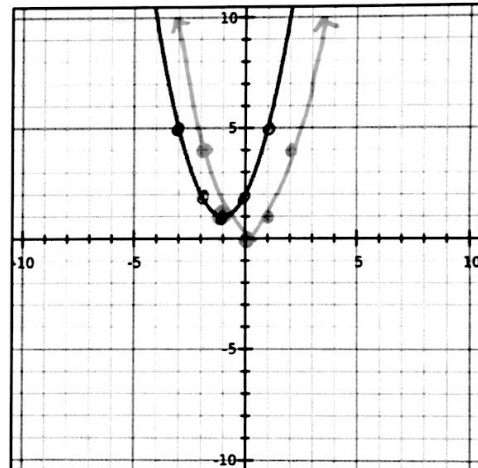
Translate left 1, up 1 unit

Step 3.) Our next clues for this function is its orientation and leading coefficient. On Pete the parent function, the two characteristic points right next to the vertex are up 1 from it. A Reflection will make the points below the vertex instead. A vertical dilation will make the points farther or closer to the vertex. List any reflections, stretches, or compressions.

None

Step 4.) Using the rules we learned last week, piece all of these clues together to write the equation $y = x^2$ with the transformations we've listed. Who is this missing function?

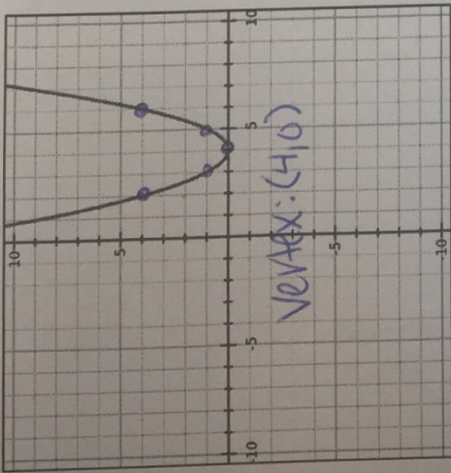
$y = (x + 1)^2 + 1 \Rightarrow$ Poisson is missing



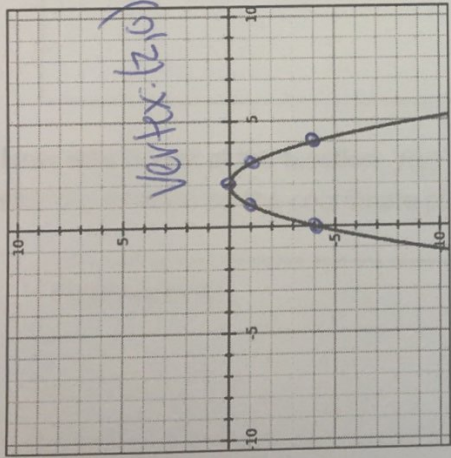
Key

Missing Identities!

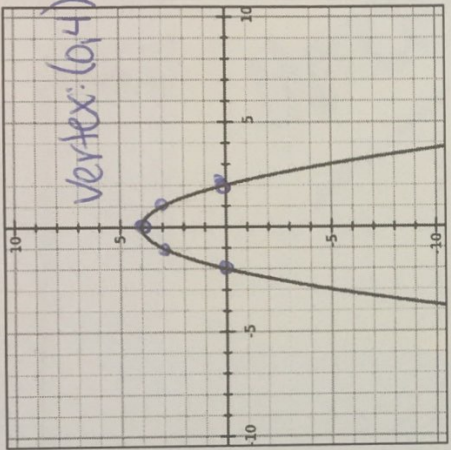
Help identify each function by matching its equation with its graph.



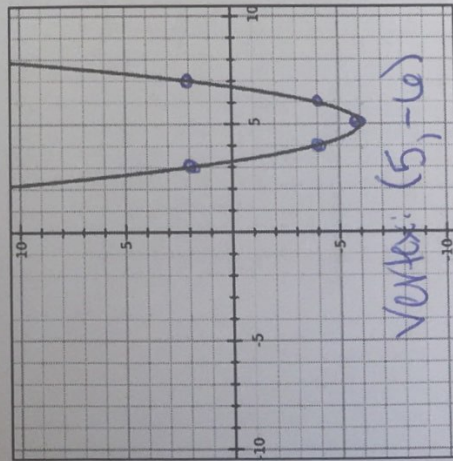
[Poe]



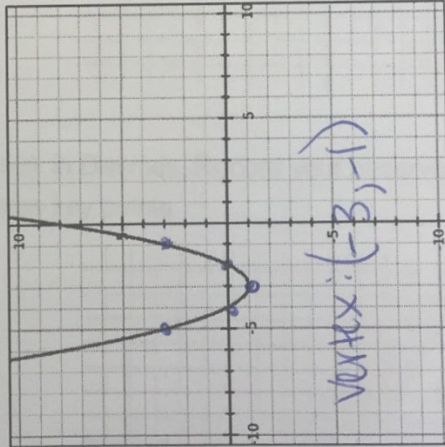
[Portia]



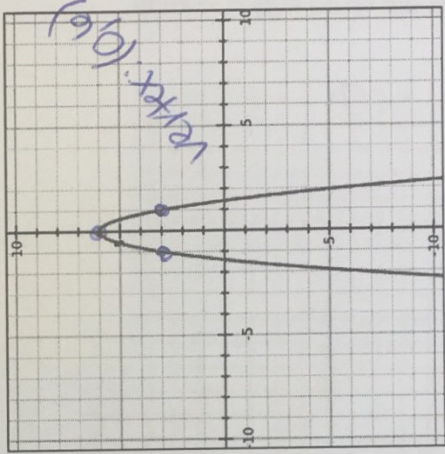
[Parker]



[Patricia]



[Porter]



[Priscilla]

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

Pablo $y = (x + 2)^2$

Pascal $y = (x - 5)^2 - 6$