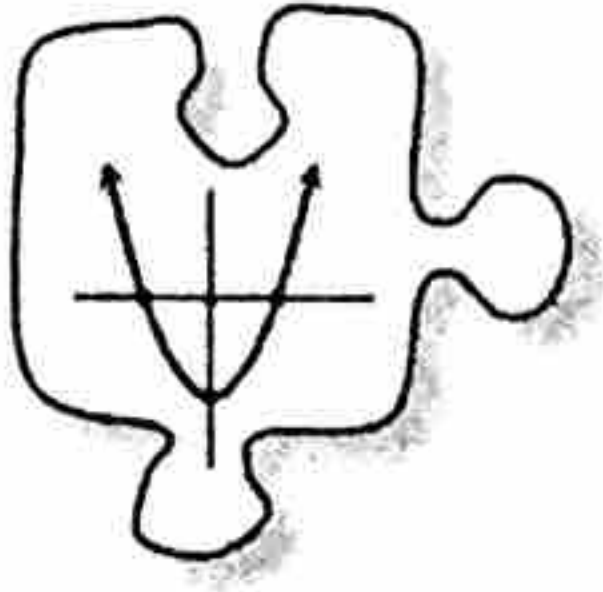


Section

5.1

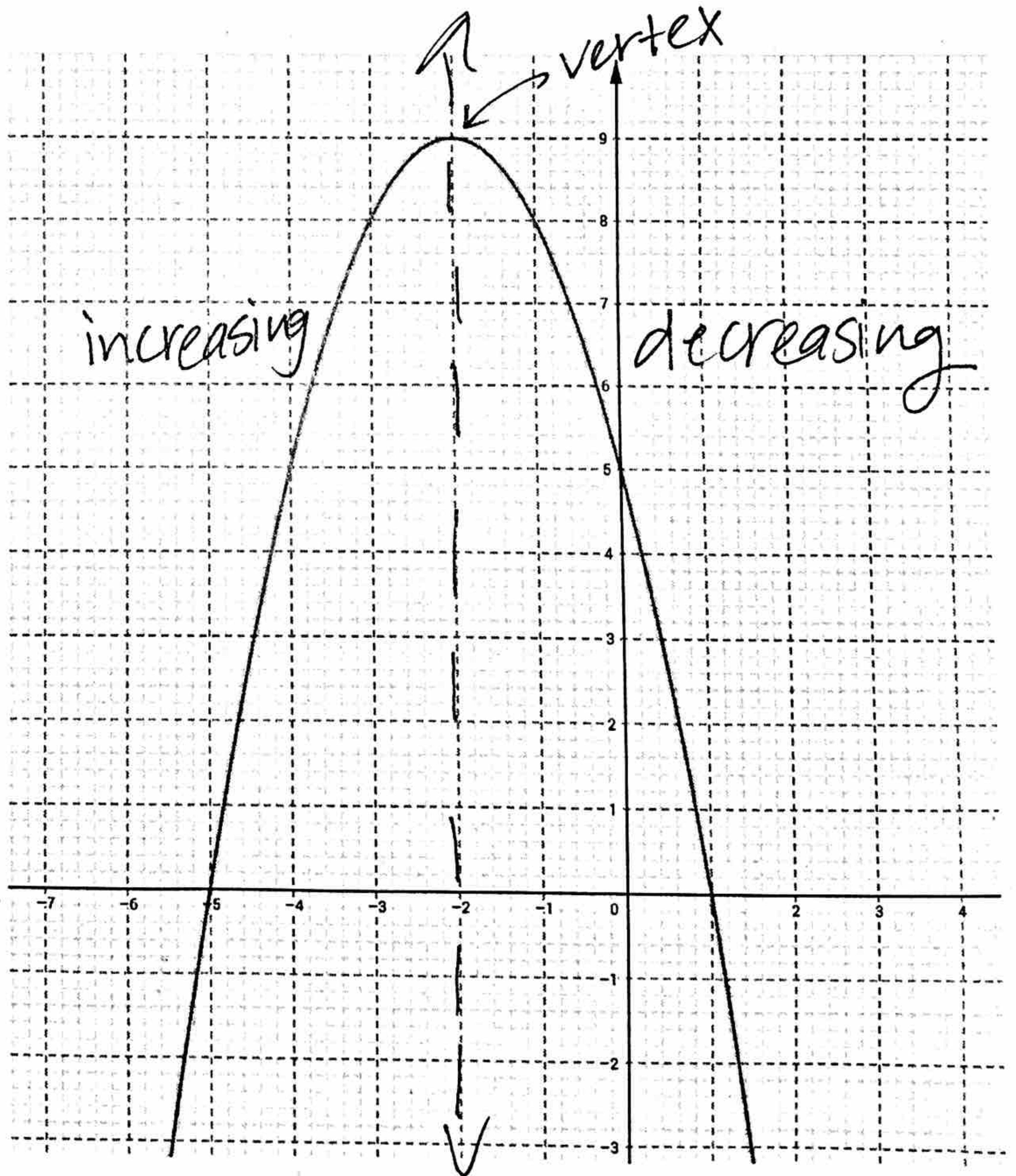
You will explore graphs, tables, and equations of quadratic functions to create a quadratic functions web. You will use the Zero Product Property to determine the x -intercepts of a parabola. You will model and answer questions about everyday situations using quadratic functions.



1. **Your Task:** Your team will be assigned specific quadratic functions to study. Investigate your team's functions and use their tables, graphs, and equations to describe them completely. Use the list of attributes for describing graphs that your class developed in Chapter 1. However, do not limit yourselves to those attributes! Describe additional features in your own words.

a)

$x-5$	y_0
-4	5
-3	8
-2	9
-1	8
0	5
1	0



Vertex: $(-2, 9)$
 Zeros: $(-5, 0)(1, 0)$
 y -int: $(0, 5)$
 opens down
 line of symmetry: $x = -2$
 domain: $-\infty$ to ∞
 range: $-\infty$ to $y = 9$

$$y = (5)^2 - 4(5) + 3 = 25 - 20 + 3$$

$$b) y = x^2 - 4x + 3$$

x	y
0	3
1	0
2	-1
3	0
4	3

$$0 = x^2 - 4x + 3$$

$$0 = (x-3)(x-1)$$

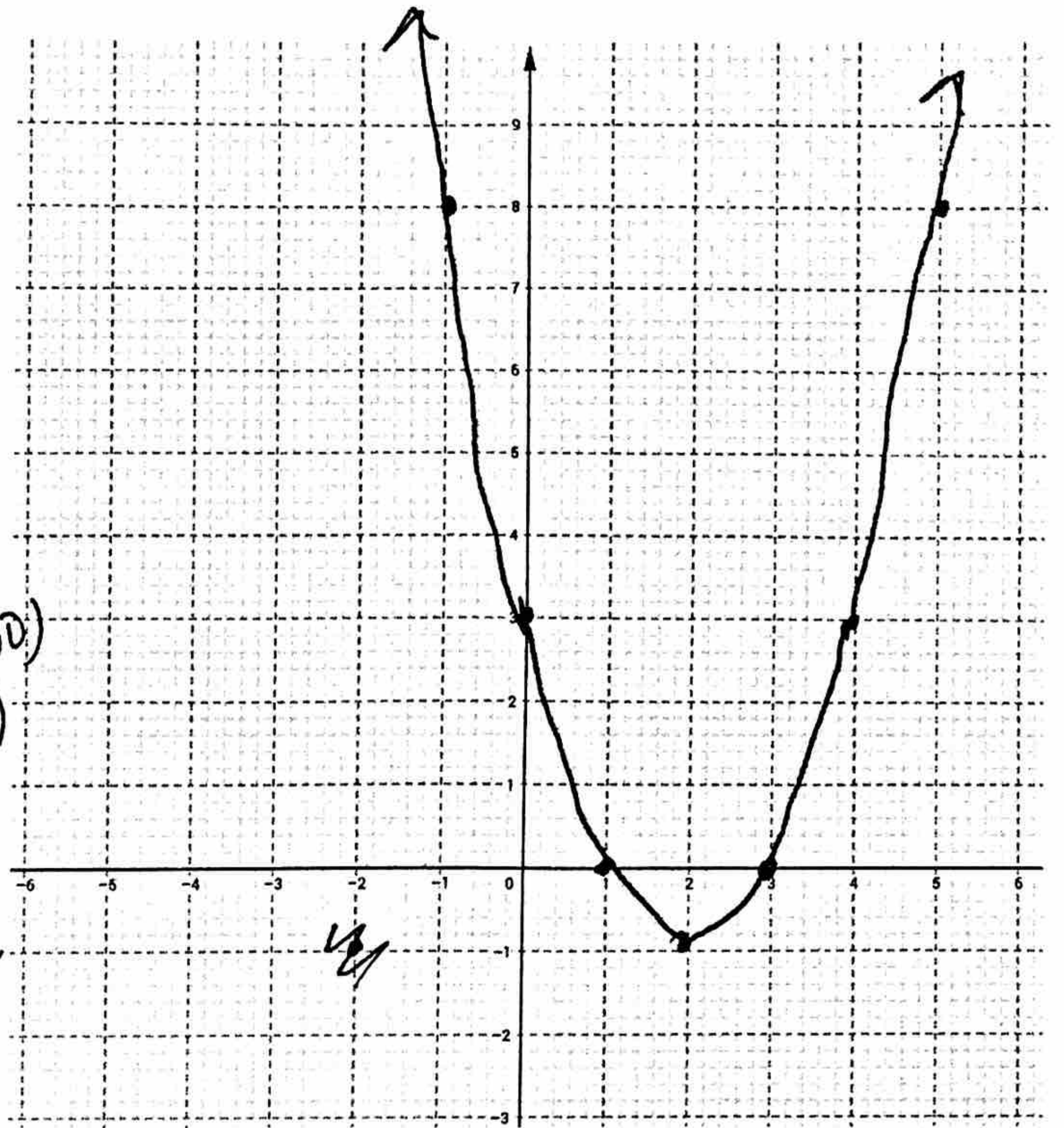
$$\begin{array}{r} x-3=0 \\ +3 \quad +3 \\ \hline x=3 \end{array} \quad \begin{array}{r} x-1=0 \\ +1 \quad +1 \\ \hline x=1 \end{array}$$

line of symmetry
 $x=2$

$$y = (2)^2 - 4(2) + 3 = 4 - 8 + 3 = -4 + 3 = -1$$

$$y = (0)^2 - 4(0) + 3 = 0 - 0 + 3 = 3$$

x-ints: (3,0), (1,0)
y-int: (0,3)
line of symmetry: $x=2$
vertex: (2,-1)



2. Zero Product Property: Explain how the zero-product property works to solve an equation. Provide an example.

When 2 quantities are multiplied and the product is zero, then 1 or both must be = to zero.

So if $x \cdot y = 0$ then $x=0$, $y=0$, or both = 0.

3. Solve using the zero-product property.

a. $6x^2 + 4x = 0$

$$2x(3x+2) = 0$$

$$\begin{array}{r} 2x=0 \\ \hline x=0, -\frac{2}{3} \end{array} \quad \begin{array}{r} 3x+2=0 \\ -2 \quad -2 \\ \hline 3x = -\frac{2}{3} \\ \hline x = -\frac{2}{9} \end{array}$$

b. $7y^2 - 4y - 3 = 0$

$$(7y+3)(y-1) = 0$$

$$\begin{array}{r} 7y+3=0 \\ -3 \quad -3 \\ \hline 7y = -3 \\ \hline y = -\frac{3}{7} \end{array} \quad \begin{array}{r} y-1=0 \\ +1 \quad +1 \\ \hline y = 1 \end{array}$$

c. $x^2 - 16 = 0$

$$(x+4)(x-4) = 0$$

$$\begin{array}{r} x+4=0 \\ -4 \quad -4 \\ \hline x = -4 \end{array} \quad \begin{array}{r} x-4=0 \\ +4 \quad +4 \\ \hline x = 4 \end{array}$$

d. $x^2 - 7x - 30 = 0$

$$(x-10)(x+3) = 0$$

$$\begin{array}{r} x-10=0 \\ +10 \quad +10 \\ \hline x = 10 \end{array} \quad \begin{array}{r} x+3=0 \\ -3 \quad -3 \\ \hline x = -3 \end{array}$$

e. $x^2 + 10x + 25 = 0$

$$(x+5)(x+5) = 0$$

$$\begin{array}{r} x+5=0 \\ -5 \quad -5 \\ \hline x = -5 \end{array}$$

f. $3x^2 + 13x - 6 = 0$

$$\frac{-13 \pm \sqrt{13^2 - 4(3)(-6)}}{2(3)} = \frac{-13 \pm \sqrt{169 + 72}}{6} = \frac{-13 \pm \sqrt{241}}{6}$$

Not factorable.
Cannot use the zero product property to solve this!

$$x = -3, 10$$