

Step-by-Step Graphing a Quadratic Function

Graph the parabola on your calculator.

$$y = x^2 + 3x + 1$$

Work out your answer on our whiteboard; your teacher will receive a copy. Then, click the buttons below to see the step-by-step answer.

Step 1

Press **[Y=]**, and for Y_1 , enter **[X,T,Θ,n]** **[x^2]** **[+]** **[3]** **[X,T,Θ,n]** **[+]** **[1]**.

```
Plot1 Plot2 Plot3
Y1=X^2+3X+1
Y2=
Y3=
Y4=
Y5=
Y6=
Y7=
```

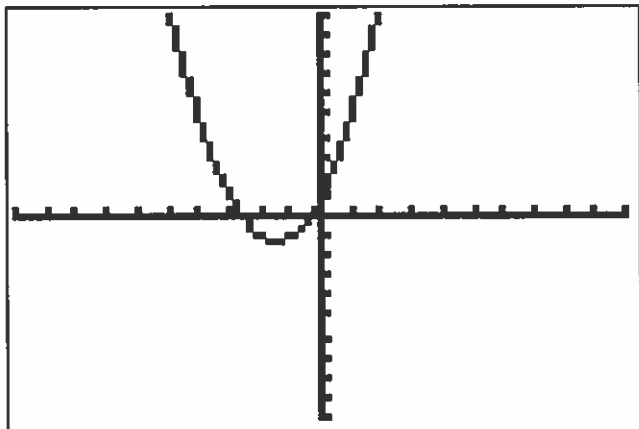
Step 2

Press **[WINDOW]** to check the window settings. The default viewing window ($X_{\min} = -10$, $X_{\max} = 10$, $X_{\text{scl}} = 1$, $Y_{\min} = -10$, $Y_{\max} = 10$, $Y_{\text{scl}} = 1$) works fine for this graph. (You might want to zoom in if you were interested in the intercepts.)

```
WINDOW
Xmin=-10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=1
```

Step 3

Press **[GRAPH]** to graph the parabola.



Step-by-Step Graphing a Quadratic on Calculator

Graph the parabola on your calculator.

$$y = -0.2x^2 + 7x - 13$$

Work out your answer on our whiteboard; your teacher will receive a copy. Then, click the buttons below to see the step-by-step answer.

Step 1

Press **Y=**, and for Y₁, enter **(-)** **0** **.** **2** **X.T.O.n** **x²** **+** **7** **X.T.O.n** **-** **1** **3**.

```
Plot1 Plot2 Plot3
Y1 = -0.2X^2+7X-13
Y2 =
Y3 =
Y4 =
Y5 =
Y6 =
```

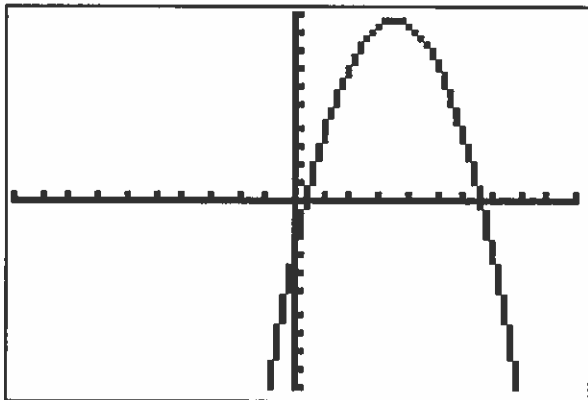
Step 2

We need a large window to see the vertex and intercepts of this parabola. Press **WINDOW** and set Xmin = -50, Xmax = 50, Xscl = 5, Ymin = -50, Ymax = 50, Yscl = 5.

```
WINDOW
Xmin=-50
Xmax=50
Xscl=5
Ymin=-50
Ymax=50
Yscl=5
Xres=1
```

Step 3

Press **GRAPH** to graph the parabola.



Graphing Quadratics Review Worksheet

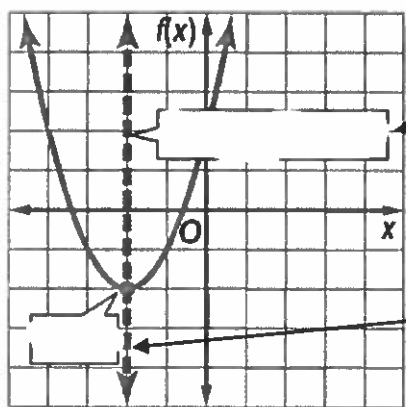
Name _____

Fill in each blank using the word bank.

vertex	minimum	axis of symmetry	x-intercepts
parabola	maximum	zeros/roots	$ax^2 + bx + c$

1. Standard form of a quadratic function is $y =$ _____

2. The shape of a quadratic equation is called a _____



3. _____

4. _____

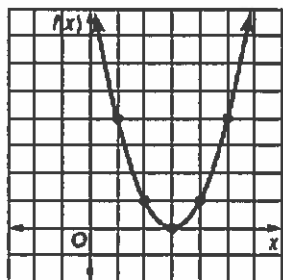
5. When the vertex is the highest point on the graph, we call that a _____.

6. When the vertex is the lowest point on the graph, we call that a _____.

7. Our solutions are the _____.

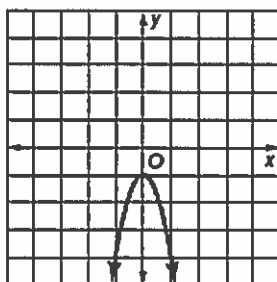
8. Solutions to quadratic equations are called _____.

Determine whether the quadratic functions have two real roots, one real root, or no real roots. If possible, list the zeros of the function.



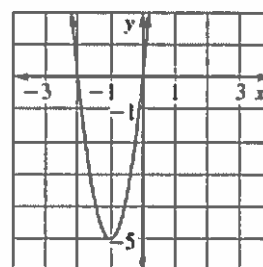
9. Number of roots: _____

Zero(s): _____



10. Number of roots: _____

Zero(s): _____



11. Number of roots: _____

Zero(s): _____

12. Given the graph, identify the following.

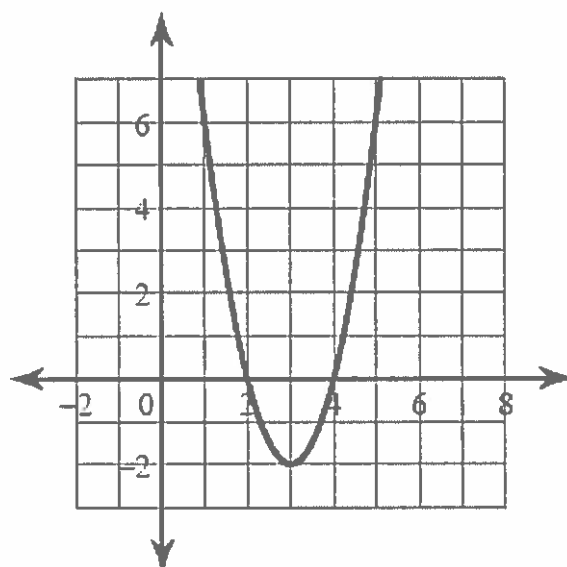
Axis of symmetry: _____

Vertex: _____

How many zeros: _____ which are: _____

Domain: _____

Range: _____



Graph the following quadratic functions by using critical values and/or factoring.

You need three points to graph and don't necessarily need all the information listed.

Remember: Option 1: If it factors, find the zeros.

 The middle of the two factors is the axis of symmetry.

Option 2: If it doesn't factor, find the axis of symmetry with $x = \frac{-b}{2a}$

Plug the x -value into the original equation to find the y -value of the vertex. The y -intercept is at $(0, c)$

13. $y = x^2 - 2x - 3$ factor or critical values?

Identify the zeros/roots: _____ and _____

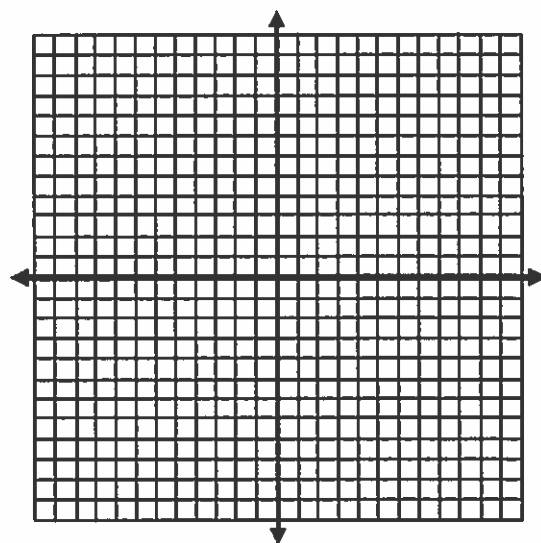
Does it have a minimum or maximum? _____

Axis of symmetry: _____ Vertex: _____

y -intercept: _____

Domain: _____ Range: _____

Graph at least 5 points



14. $y = -x^2 - 4x + 5$ factor or critical values?

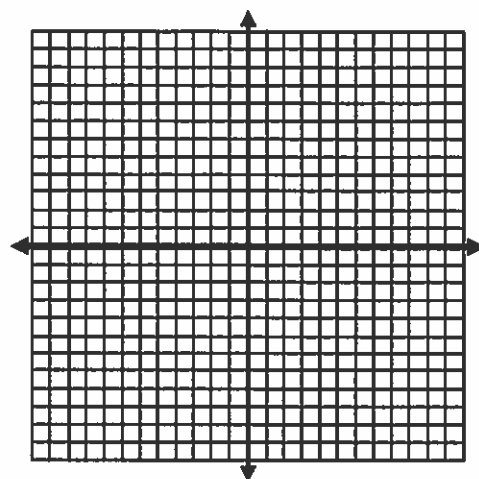
Identify the zeros/roots: _____ and _____

Does it have a minimum or maximum? _____

Axis of symmetry: _____ Vertex: _____

y-intercept: _____ Graph at least 5 points

Domain: _____ Range: _____

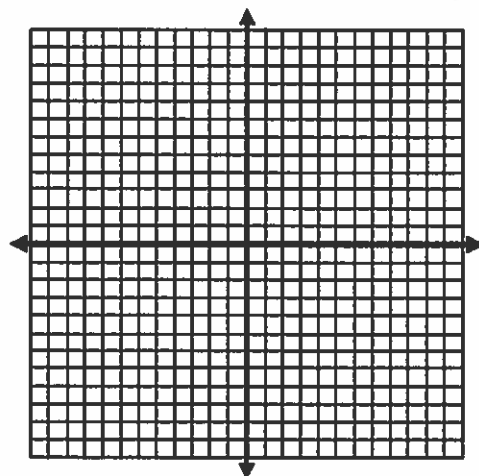


15. $y = x^2 + 4x + 7$ factor or critical values?

Axis of symmetry: _____ Vertex: _____

Max or Min? _____

y-intercept: _____ Graph at least 3 points

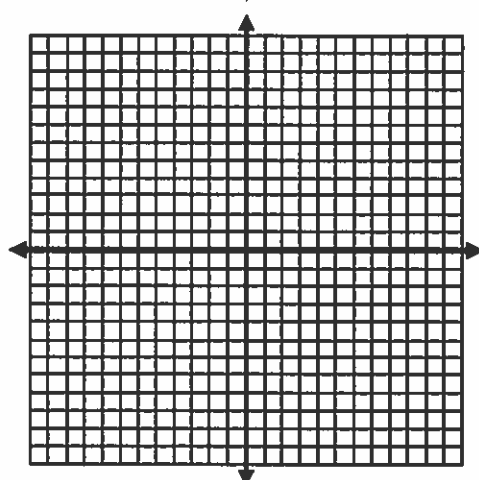


16. $y = -x^2 - 2x + 2$ factor or critical values?

Axis of symmetry: _____ Vertex: _____

Max or Min? _____

y-intercept: _____ Graph at least 5 points



17. A bottlenose dolphin jumps out of the water. The path the dolphin travels can be modeled by $h = -0.2d^2 + 2d$, where h represents the height of the dolphin and d represents horizontal distance.

a. What is the maximum height the dolphin reaches?

b. How far did the dolphin jump?

9.1 Review Answers

1. $ax^2 + bx + c$

2. parabola

3. axis of symmetry

4. vertex

5. maximum

6. minimum

7. x-intercepts

8. zeros or roots

9. 1; 3

10. 0; none

11. 2; -2 and 0

12. $x = 3$; (3, -2)

2; 2 and 4

all reals; $y \geq -2$

13. factor

-1 and 3

minimum

$x = 1$; (1, -4)

(0, -3)

all reals; $y \geq -4$

14. factor

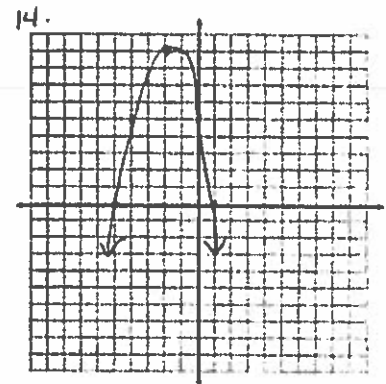
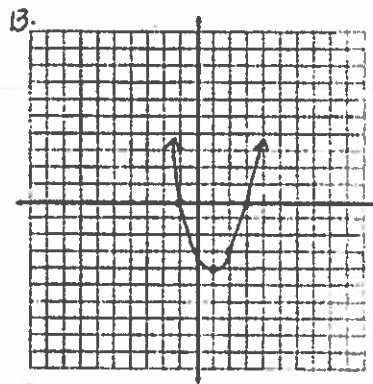
-5 and 1

maximum

$x = -2$; (-2, 9)

(0, 5)

all reals; $y \leq 9$

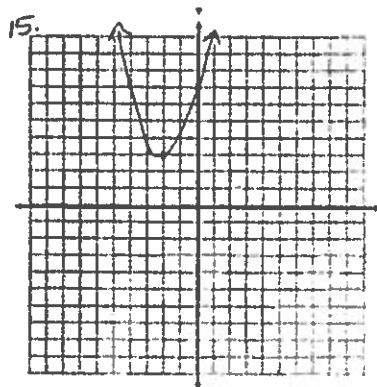


15. critical values

$x = -2$; (-2, 3)

minimum

(0, 7)

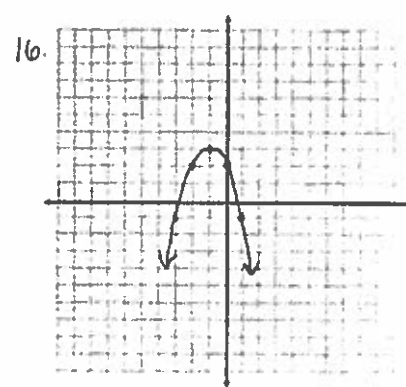


16. critical values

$x = -1$; (-1, 3)

maximum

(0, 2)



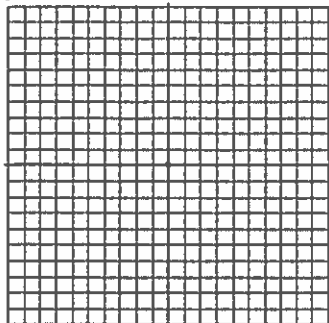
17. a. 5 feet

b. 10 feet

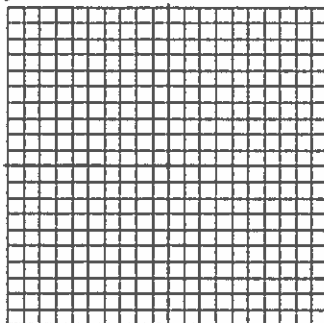
Name: _____

Alg. 2 Graphing Quadratics

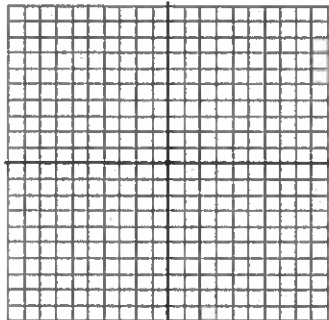
1. $y = x^2 - 8x + 10$



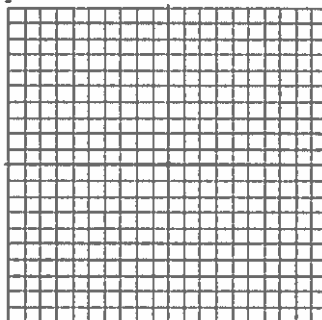
2. $y = x^2 - 12x + 38$



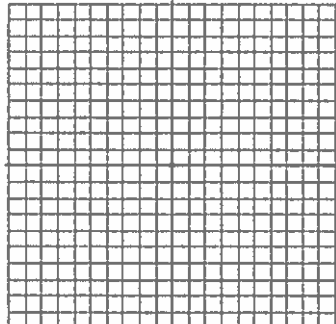
3. $y = 3x^2 - 6x + 1$



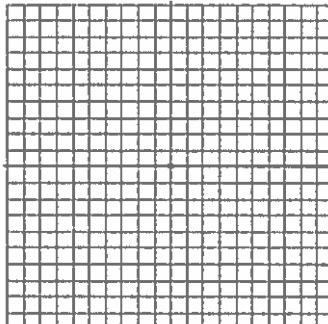
4. $y = -2x^2 + 20x - 51$



5. $y = x^2 - 4x + 10$



6. $y = -x^2 + 6x - 8$

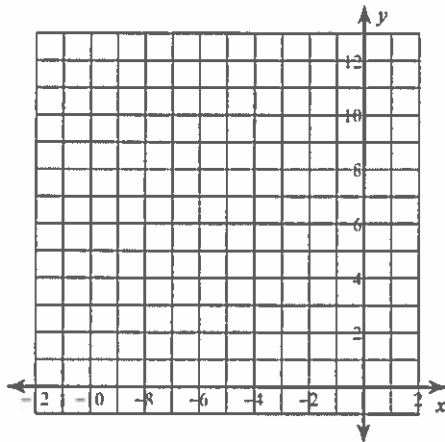




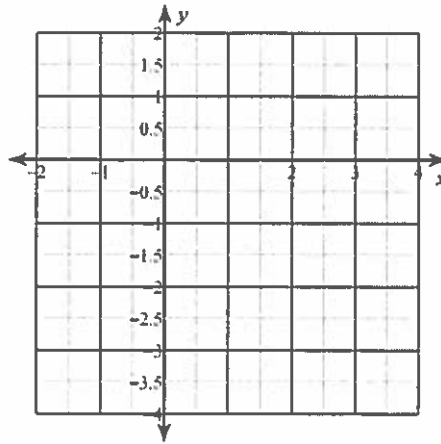
Graphing Quadratic Functions

Sketch the graph of each function.

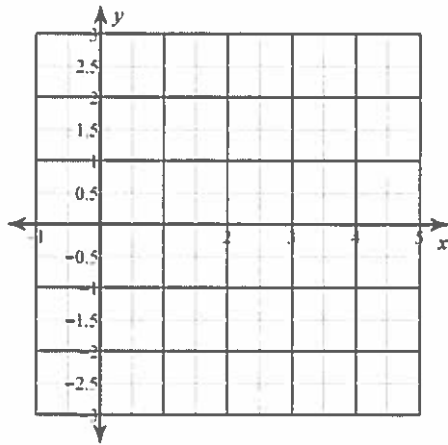
1) $y = 3x^2$



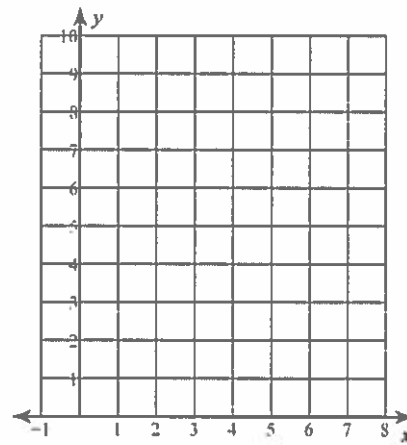
2) $y = -\frac{1}{2}x^2$



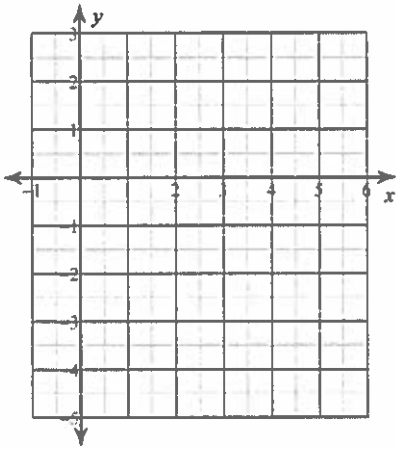
3) $y = -x^2 + 2x + 1$



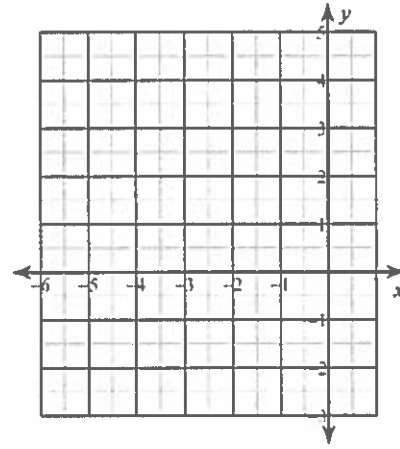
4) $y = 2x^2 - 16x + 33$



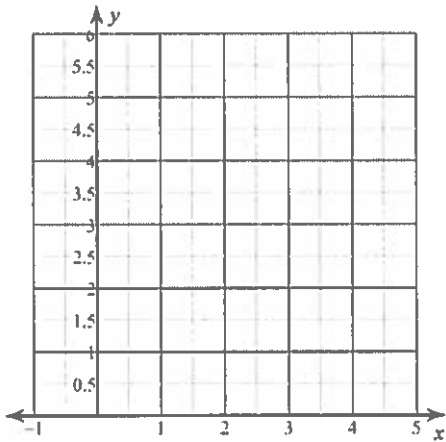
5) $y = x^2 - 8x + 13$



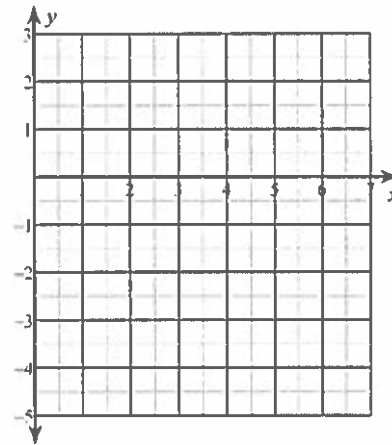
6) $y = -x^2 - 8x - 13$



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



8) $y = \frac{1}{2}(x - 4)^2 - 2$



Name: _____

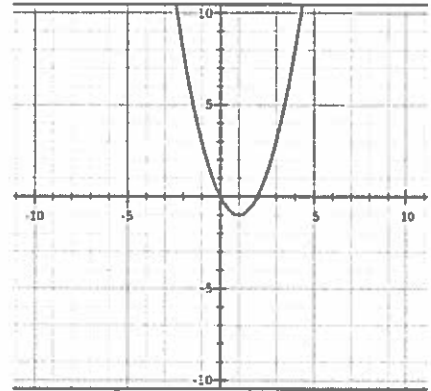
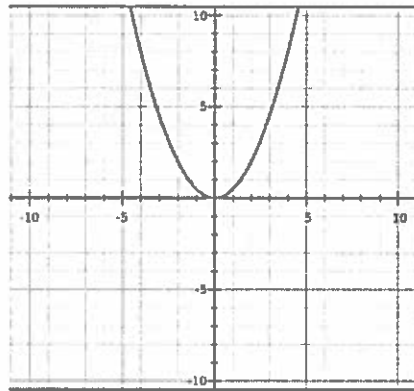
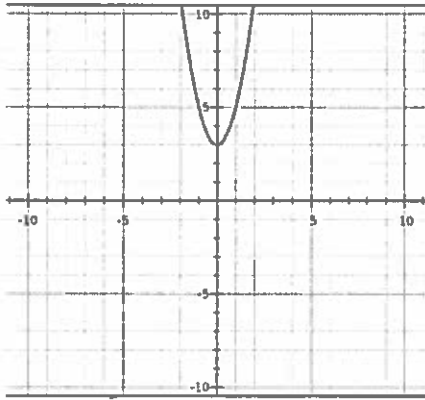
Alg. 2 Quadratics Quiz Review

Match the Function to the Graph:

1. $f(x) = 2x^2 + 3$

2. $f(x) = x^2 - 2x$

3. $f(x) = 1/2x^2$

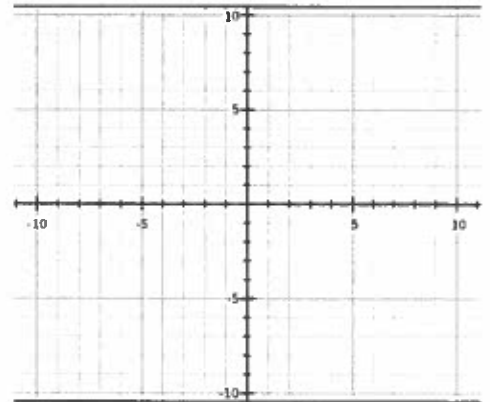
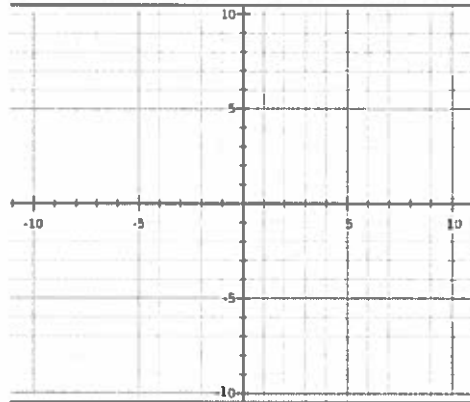
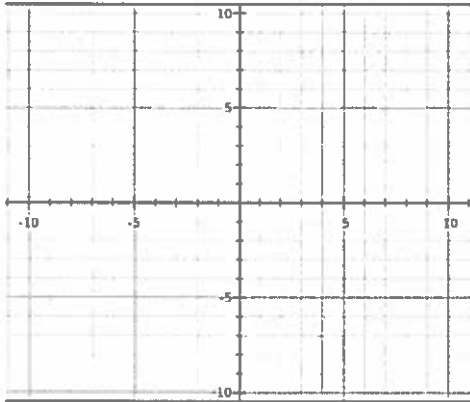


Graph the Following Functions:

4. $f(x) = x^2 - 2$

5. $f(x) = -x^2 - 2$

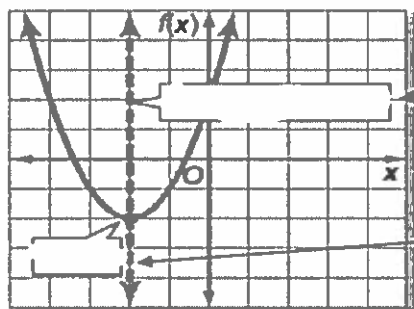
6. $f(x) = x^2 - 2x$



Describe the Similarities and Differences of the Quadratic Functions : $f(x) = 3x^2 + 4x - 5$ and $f(x) = x^2$

1. Standard form of a quadratic function is $y = \underline{\hspace{2cm}}$

2. The shape of a quadratic equation is called a $\underline{\hspace{2cm}}$



3. $\underline{\hspace{2cm}}$

4. $\underline{\hspace{2cm}}$

5. When the vertex is the highest point on the graph, we call that a $\underline{\hspace{2cm}}$.

6. When the vertex is the lowest point on the graph, we call that a $\underline{\hspace{2cm}}$.

7. Our solutions are the $\underline{\hspace{2cm}}$.

8. Solutions to quadratic equations are called $\underline{\hspace{2cm}}$.

13. $y = x^2 - 2x - 3$

Identify the zeros/roots: $\underline{\hspace{1cm}}$ and $\underline{\hspace{1cm}}$

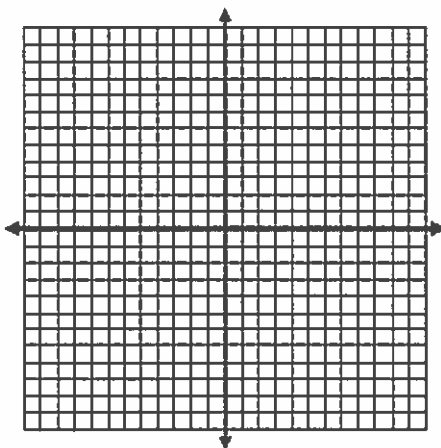
Does it have a minimum or maximum? $\underline{\hspace{1cm}}$

Axis of symmetry: $\underline{\hspace{1cm}}$ Vertex: $\underline{\hspace{1cm}}$

y-intercept: $\underline{\hspace{1cm}}$

Domain: $\underline{\hspace{1cm}}$ Range: $\underline{\hspace{1cm}}$

Graph at least 5 points



14. $y = -x^2 - 4x + 5$

Identify the zeros/roots: $\underline{\hspace{1cm}}$ and $\underline{\hspace{1cm}}$

Does it have a minimum or maximum? $\underline{\hspace{1cm}}$

Axis of symmetry: $\underline{\hspace{1cm}}$ Vertex: $\underline{\hspace{1cm}}$

y-intercept: $\underline{\hspace{1cm}}$ Graph at least 5 points

Domain: $\underline{\hspace{1cm}}$ Range: $\underline{\hspace{1cm}}$

