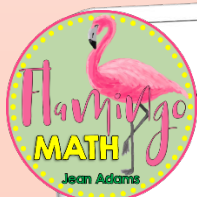


Algebra 2 Honors

Standard Form of a Quadratic Function



Finding Vertex Form

Find vertex form for
 $f(x) = 2x^2 - 8x - 3$

1) Goal: $y = a(x-h)^2 + k$

2) $a = 2$

3) Vertex

$$x = \frac{-(-8)}{2(2)}$$

$$x = 2 \text{ "h"}$$

$$f(2) = 2(2)^2 - 8(2) - 3$$

$$f(2) = 8 - 16 - 3$$

$$f(2) = -11 \text{ "k"}$$

4) Vertex form:

$(2, -11)$
 (h, k)

EX #5: Find vertex form for
 $f(x) = -x^2 + 4x - 5$

1) $a = -1$

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

$$x = 2 \text{ "h"}$$

$$f(2) = -(2)^2 + 4(2) - 5$$

$$f(2) = -4 + 8 - 5$$

$$f(2) = -1$$

3) $a = -1$ $h = 2$, $k = -1$

4) vertex form:

$$y = -1(x-2)^2 - 1$$

$(2, -1)$
 (h, k)

Completely Editable

4.2

Lesson 2: Standard Form of a Quadratic Function

Any function that can be written in the form $f(x) = ax^2 + bx + c$, where $a \neq 0$ is said to be in _____. You can find information about the quadratic function from the coefficients a , b , and c .

PROPERTIES OF QUADRATICS IN STANDARD FORM:

- ☐ The graph is a _____
- ☐ If $a > 0$, the parabola opens _____
- ☐ If $a < 0$ the parabola opens _____
- ☐ The axis of symmetry is the line _____
- ☐ The x-coordinate of the vertex is _____
- ☐ The y-coordinate of the vertex is _____
- ☐ The y-intercept is _____

Finding the Features of a Quadratic

EX #1: Use a calculator to find the features of the quadratic by looking at the table.
 $y = -3x^2 - 6x + 8$

Vertex: _____

Axis of symmetry: _____

Maximum/minimum: _____

Range: _____

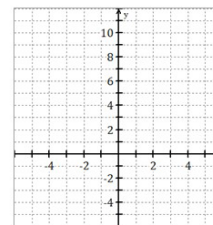
x	y

Graphing a Function of $f(x) = ax^2 + bx + c$

A procedure to graph a parabola in standard form:

1. Identify a , b , and c .
2. Determine the shape of the graph.
3. Find the axis of symmetry, sketch.
4. Find the Vertex.
x-coordinate of vertex
y-coordinate of vertex
5. Plot the y-intercept.
6. Find a reflected point.
7. Sketch the curve.

EX #2: $y = x^2 - 4x + 1$



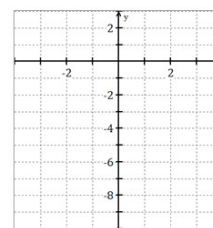
EX #3: Graph $y = -2x^2 + 2x - 5$

Vertex: _____

Axis of Symmetry: _____

y-intercept: _____

Reflected Point: _____



Finding Vertex Form

EX #4: Find vertex form for
 $f(x) = 2x^2 - 8x - 3$

EX #5: Find vertex form for
 $f(x) = -x^2 + 4x - 5$

Interpreting a Quadratic

EX #6: A model for the performance of a stock is $P = -3d^2 + 50d$, where d represents the days of trading and P is the price per share. What is the maximum price per share of the stock?

Interpreting a Quadratic Graph

EX #7: The New River Gorge Bridge in West Virginia is the world's largest steel single arch bridge. You can model the arch with the function $y = -0.000498x^2 + 0.847x$, where x and y are measured in feet. Approximately how high above the river is the bridge? How long is the bridge?

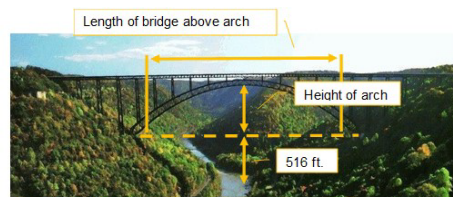


Photo source: Adobe Stock Photos

NOTES

Name _____ Date _____

4.2

Standard Form of a Quadratic Function Practice

Problems 1–4, identify the vertex, the axis of symmetry, the maximum or minimum values, and the range of each parabola.

1. $f(x) = x^2 + 7x + 6$

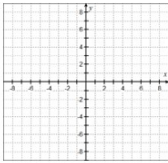
2. $f(x) = 24 - 5x - x^2$

3. $g(x) = 2x^2 - 5x - 7$

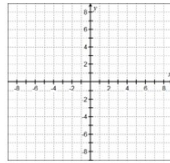
4. $h(x) = -3x^2 + 4x + 2$

Problems 5–8, graph each function.

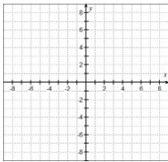
5. $f(x) = x^2 - 6x + 9$



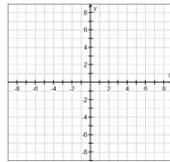
6. $f(x) = -x^2 - 2x - 6$



7. $f(x) = \frac{1}{2}x^2 + 2x - 8$



8. $f(x) = -x^2 + 3x - 2$



Problems 9–12, Write each function in vertex form.

9. $f(x) = 2x^2 + 12x + 13$

10. $h(x) = -3x^2 + 9x$

11. $g(x) = 2x^2 - 5x + 12$

12. $f(x) = \frac{3}{4}x^2 - 6x + 20$

Problems 13–14, given the vertex, find the missing information for each coefficient.

13. $y = x^2 + bx + c$; vertex $(-3, -5)$

14. $y = -x^2 - 8x + c$; vertex $(-4, 7)$

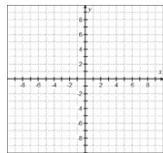
Problems 15–16, find the y -intercept.

15. $y = -3(x - 2)^2 + 8$

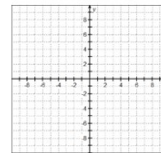
16. $y = \frac{1}{2}(x + 6)^2 - 14$

Problems 17–18, sketch the parabola using given information.

17. vertex: $(2, -5)$ y -intercept: $(0, -1)$



18. vertex: $(1, 4)$ point: $(3, 0)$



Problems 19–21, solve.

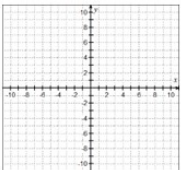
19. The equation for the cost of producing truck tires is $C = 0.002x^2 - 3.2x + 1325$, where x is the number of tires produced. Find the number of tires that minimizes the cost. What is the cost for that number of tires?

20. You are framing a picture and have a 9-foot section of wood moulding to create the frame. What dimensions for the frame would give you the maximum area for the picture? What is the maximum area?

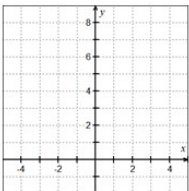
21. If your expenses to perform are \$1,570 and there are 3 band members, how much will each member receive for playing the event?

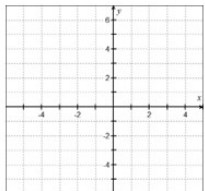
Practice Sets

Lesson Warm-Ups

Name _____ Date _____ Period _____	
Lesson 4.2: Standard Form of a Quadratic Function Warm-Up #1	
1. Find the vertex and one other point on the parabola. $y = x^2 + 16x + 64$	2. Graph the parabola.
	
3. Write the equation for the parabola in vertex form: $y = a(x - h)^2 + k$	4. Given $f(x) = 2x^2 - 4x - 2$, find the vertex and determine if the vertex is a maximum or minimum of the parabola.

Name _____ Date _____	
Lesson 4.2: Standard Form of a Quadratic Function	
1. Find the vertex and one other point on the parabola. $y = -3x^2 + 12x - 10$	2. Graph the parabola.
3. Write the equation for the parabola in vertex form: $y = a(x - h)^2 + k$	4. Given $f(x) = -x^2 + 2x + 3$, find the vertex and determine if the vertex is a maximum or minimum of the parabola.

4.2 Standard Form of a Quadratic Function	Form A
Name _____	
Date _____ Period _____	
Questions 1 - 3, use: $y = x^2 - 6x + 7$	
1. Find the vertex and one other point on the parabola.	
2. Graph the parabola on the grid.	
	
3. Write the equation for the parabola in vertex form: $y = a(x - h)^2 + k$	
4. Given: $f(x) = -x^2 + 2x + 3$	

4.2 Standard Form of a Quadratic Function	Form B
Name _____	
Date _____ Period _____	
Questions 1 - 3, use: $y = x^2 + 4x - 1$	
1. Find the vertex and one other point on the parabola.	
2. Graph the parabola on the grid.	
	
3. Write the equation for the parabola in vertex form: $y = a(x - h)^2 + k$	
4. Given: $f(x) = -x^2 - 2x + 2$	

Daily Lesson Quiz

Grade: _____

Grade: _____