

Remember to copy the problem and only the correct answer...

April 8, 2019, Monday - welcome back!!

1. Look at the radical.

$$\sqrt{-8/726}$$

 What is a rewritten form of the radical?
 A. $-8/18$
 B. $-90/75$
 C. $-986/6$
 D. $-2/904$

2. Look at the expression.

$$2/8 \cdot 1/20$$

 Which of these is equivalent to this expression?
 A. $2/28$
 B. 5
 C. $-4/10$
 D. $32/10$

3. Which sum is rational?

$$BS \quad 2.14159$$

$$VK \quad -6.75$$

$$SBI \quad 7.237050808$$

$$MB \quad 5.141592654$$

4. Which product is irrational?
 A. $12 \cdot 150$
 B. $164 \cdot 14$
 C. $19 \cdot 149$
 D. $10 \cdot 18$

Answers to Unit 1.1 Sample Items
 1. A 2. C 3. B 4. D

SOLVING A QUADRATIC EQUATION

FACTORING: $x^2 + 5x + 6 = 0$
 $(x+2)(x+3) = 0$
 $x+2=0 \rightarrow x=-2$
 $x+3=0 \rightarrow x=-3$

QUADRATIC FORMULA: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 ALWAYS WORKS

COMPLETING THE SQUARE: $x^2 + 8x + 11 = 0$
 $x^2 + 8x = -11$
 $(x+4)^2 = -11 + 16$
 $(x+4)^2 = 5$
 $x+4 = \pm\sqrt{5}$
 $x = -4 \pm \sqrt{5}$

TAKING SQUARE ROOTS: $x^2 = 16$
 $x = \pm 4$
 $y = \text{NO SOLUTION}$

GRAPHING: $x^2 + 8x + 11 = 0$
 2 real solutions
 1 real solution (2 complex/imaginary)

The "Parent" Quadratic

A parent function is the simplest function of a family of functions. The "Parent" Graph: ... The graph passes through the origin (0,0), and is contained in Quadrants I and II. This graph is known as the "Parent Function" for parabolas, or quadratic functions.

Child: Whatever...
 Parent: You are going to do what I say!

Other facts about the parent quadratic $y = x^2$

- There is 1 solution $x=0, x=0$
- y-intercept = 0
- x-intercept = 0
- slope changes: increasing/decreasing
- open "up"

Graphing Quadratics & Vocabulary Practice

1) Graph $f(x) = x^2 - 4$
 Vertex: $(0, -4)$
 X-intercepts: $(-2, 0), (2, 0)$
 Y-intercept: $(0, -4)$
 Transformations: Moves left 3

2) Graph $f(x) = x^2 - 3$
 Vertex: $(0, -3)$
 X-intercepts: $(-\sqrt{3}, 0), (\sqrt{3}, 0)$
 Y-intercept: $(0, -3)$
 Transformations: Move right 2, down 3

3) Graph $f(x) = -x^2 + 10$
 Vertex: $(0, 10)$
 X-intercepts: $(-3, 0), (3, 0)$
 Y-intercept: $(0, 10)$
 Transformations: opens down, up 2 stretch

4) Graph $f(x) = x^2 - 4$
 Vertex: $(0, -4)$
 X-intercepts: $(-2, 0), (2, 0)$
 Y-intercept: $(0, -4)$
 Transformations: open down, right 1, down 4 stretch

Characteristics of Quadratics

SAME FOR EVERY QUADRATIC GRAPH:
 Y-intercept: $(0, \#)$
 Domain: $(-\infty, +\infty)$
 Average Rate of change: From point $A(x_1, y_1)$ to point $B(x_2, y_2)$ is $\frac{y_2 - y_1}{x_2 - x_1}$

For a quadratic that OPENS UP:
 Vertex: lowest point
 Axis of Symmetry: $x = _$ \rightarrow x-value of the vertex
 Range: $[_ , +\infty)$ \rightarrow y-value of the vertex
 Extreme: minimum at the vertex
 End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow \pm\infty$
 As $x \rightarrow +\infty, f(x) \rightarrow \pm\infty$
 Interval of Increase: RIGHT of the graph $(_, +\infty) \rightarrow$ x-value of the vertex
 Interval of Decrease: LEFT of the graph $(-\infty, _) \rightarrow$ x-value of the vertex

For a quadratic that OPENS DOWN:
 Vertex: highest point
 Axis of Symmetry: $x = _$ \rightarrow x-value of the vertex
 Range: $(-\infty, _]$ \rightarrow y-value of the vertex
 Extreme: maximum at the vertex
 End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow \pm\infty$
 As $x \rightarrow +\infty, f(x) \rightarrow \pm\infty$
 Interval of Increase: LEFT of the graph $(-\infty, _) \rightarrow$ x-value of the vertex
 Interval of Decrease: RIGHT of the graph $(_, +\infty) \rightarrow$ x-value of the vertex

Transformations of Quadratics

$y = x^2$
 $f(x) = \pm a(x \mp h)^2 \pm k$

Handwritten Notes:
 A fraction is a stretch, a whole # is a shrink.
 + is left, - is right.
 + opens up, - opens down.
 Use words like shifts left/right, opens up/down, stretch or shrink.
 Describe:
 1) $y = 2(x+2)^2 + 2$: left 2, up 2, stretch.
 2) $y = -(x-1)^2 + 5$: right 1, up 5, opens down, shrink.
 3) $y = \frac{1}{2}(x-2)^2 - 1$: right 2, down 1, opens up, stretch.
 4) $y = (x+3)^2 - 1$: left 3, down 1, opens up, stretch.
 5) $y = \frac{1}{4}(x-2)^2 + 1$: right 2, up 1, opens up, shrink.

Algebra 1 - USC Day 1 Characteristics & Vocab of Quadratic Functions

Fill in each blank using the word bank.

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

- Standard form of a quadratic function is $y = \underline{\hspace{2cm}}$
- The shape of a quadratic equation is called a parabola.

- _____
- _____

- When the vertex is the highest point on the graph, we call that a maximum.
- When the vertex is the lowest point on the graph, we call that a minimum.
- Our solutions are the x-intercepts.
- Solutions to quadratic equations are called zeros/roots.

Find the a. vertex, b. axis of symmetry, and c. x-intercepts, and d. y-intercept of each quadratic function from its graph.

- Vertex: (-2, 0)
 Axis of symmetry: $x = \underline{-2}$
 x-intercept(s): -2
 y-intercept: 0
- Vertex: (-2, 0)
 Axis of symmetry: $x = \underline{-2}$
 x-intercept(s): -2
 y-intercept: 0
- Vertex: (-2, 0)
 Axis of symmetry: $x = \underline{-2}$
 x-intercept(s): -2
 y-intercept: 0

Graphing Quadratics Using Tables

1) Graph $f(x) = x^2$.

x	f(x)
-2	4
-1	1
0	0
1	1
2	4

Zeros: _____
 Y-intercept: _____
 Vertex: _____
 Axis of Symmetry: _____

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

x	f(x)
-2	0
-1	-3
0	-4
1	-3
2	0

Zeros: _____
 Y-intercept: _____
 Vertex: _____
 Axis of Symmetry: _____

TOTD - USC Day 1 Name _____

x-intercept(s): _____
 y-intercept: _____
 Vertex: _____
 Axis of Symmetry: _____

TOTD - USC Day 1 Name _____

x-intercept(s): _____
 y-intercept: _____
 Vertex: _____
 Axis of Symmetry: _____

Graph: $f(x) = (x+1)^2 - 5$

x	f(x)
-2	-4
-1	-5
0	-4
1	1
2	6

Graph: $f(x) = (x-1)^2 - 5$

x	f(x)
-2	-16
-1	-10
0	-4
1	-5
2	-10
3	-16

Graph: $f(x) = 2x^2 - 5$

x	f(x)
-2	3
-1	-3
0	-5
1	-3
2	3

Graph: $f(x) = \frac{1}{2}x^2 - 5$

x	f(x)
-2	-4
-1	-5.5
0	-5
1	-5.5
2	-4

test review

9) $x^2 - 33 = -8x$ $ax^2 + bx + c = 0$
 $+8x$ $+8x$
 $x^2 + 8x - 33 = 0$ $a = 1$
 $X = \frac{-8 \pm \sqrt{(8)^2 - 4(1)(-33)}}{2(1)}$ $b = 8$
 $c = -33$

A $x = 3, -11$

4) $9x^2 - 36 = 0$
 $+36$ $+36$
 $9x^2 = 36$
 $\frac{9x^2}{9} = \frac{36}{9}$
 $x^2 = 4$
 $x = \pm 2$

16) Find and circle the error. Then give the correct answer by solving by completing the square.

$x^2 + 6x - 13 = 0$
 $+13$ $+13$
 $x^2 + 6x = 13$
 $x^2 + 6x + 9 = 13 + 9$
 $(x+3)^2 = 22$
 $x+3 = \pm\sqrt{22}$
 $x = -3 \pm \sqrt{22}$

April 9, 2019, Tuesday

1. This equation can be used to find A , the number of hours it will take Flo and Bryan to mow their lawn.

$$\frac{A}{3} + \frac{A}{6} = 1$$

How many hours will it take them to mow their lawn?

A. 6
B. 3
C. 2
D. 1

A) $\frac{A}{3} + \frac{A}{6} = 1$
 $\frac{2A}{6} + \frac{A}{6} = 1$
 $\frac{3A}{6} = 1$
 $\frac{3A}{3} = \frac{6}{3}$
 $A = 2$

B) $\frac{A}{3} + \frac{A}{6} = 1$
 $\frac{2A}{6} + \frac{A}{6} = 1$
 $\frac{3A}{6} = 1$
 $\frac{3A}{3} = \frac{6}{3}$
 $A = 2$

4. Look at the steps used when solving $3(x - 2) = 3$ for x .

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

Write the original equation.

$$3x - 6 = 3$$

Use the Distributive Property.

Step 1: $3x - 6 + 6 = 3 + 6$

Step 2: $3x = 9$

Step 3: $\frac{3x}{3} = \frac{9}{3}$

Step 4: $x = 3$

Which step is the result of combining like terms?

A. Step 1
B. Step 2
C. Step 3
D. Step 4

Sample Items 4. B

Algebra 1 - U3C Day 2

Characteristics of Quadratics Notes

Characteristics of Quadratics

- Zeros:
- Y-intercept:
- Domain:
- Vertex:
- Axis of Symmetry:
- Range:
- Extrema:
- Interval of Increase:
- Interval of Decrease:
- End Behavior:

As $x \rightarrow -\infty$, $f(x) \rightarrow$ _____
 As $x \rightarrow +\infty$, $f(x) \rightarrow$ _____

11.AROC [-1, 0]

- Zeros:
- Y-intercept:
- Domain:
- Vertex:
- Axis of Symmetry:
- Range:
- Extrema:
- Interval of Increase:
- Interval of Decrease:
- End Behavior:

As $x \rightarrow -\infty$, $f(x) \rightarrow$ _____
 As $x \rightarrow +\infty$, $f(x) \rightarrow$ _____

11.AROC [0, 2]

Quadratic: Characteristics/Transformations HW

Name _____

- Zeros:
- Y-intercept:
- Domain:
- Vertex:
- Axis of Symmetry:
- Range:
- Extrema:
- Interval of Increase:
- Interval of Decrease:
- End Behavior:

As $x \rightarrow -\infty$, $f(x) \rightarrow$ _____
 As $x \rightarrow +\infty$, $f(x) \rightarrow$ _____

11.AROC [2, 4]

- Zeros:
- Y-intercept:
- Domain:
- Vertex:
- Axis of Symmetry:
- Range:
- Extrema:
- Interval of Increase:
- Interval of Decrease:
- End Behavior:

As $x \rightarrow -\infty$, $f(x) \rightarrow$ _____
 As $x \rightarrow +\infty$, $f(x) \rightarrow$ _____

11.AROC [-1, 1]

Describe the transformations.

1. $y = x^2 + 2$	6. $y = x^2 - 2$
2. $y = 2x^2$	7. $y = \frac{1}{2}x^2$
3. $y = (x - 2)^2$	8. $y = (x + 2)^2$
4. $y = -(x - 3)^2 + 1$	9. $y = -(x - 1)^2 - 1$
5. $y = \frac{1}{2}(x - 2)^2$	10. $y = -2(x + 1)^2 - 1$

Quadratic Characteristics - TOTD

1) $f(x) = -2(x - 2)^2 + 2$

Transformations:

Domain: _____
 Range: _____
 x-intercept(s): _____
 y-intercept: _____
 Vertex: _____
 Axis of Symmetry: _____
 Interval of Increase: _____
 Interval of Decrease: _____
 Extrema: _____
 End Behavior: _____
 As $x \rightarrow -\infty$, $f(x) \rightarrow$ _____
 As $x \rightarrow +\infty$, $f(x) \rightarrow$ _____
 AROC from (0, _____) to (2, _____)

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

Transformations:

Domain: _____
 Range: _____
 x-intercept(s): _____
 y-intercept: _____
 Vertex: _____
 Axis of Symmetry: _____
 Interval of Increase: _____
 Interval of Decrease: _____
 Extrema: _____
 End Behavior: _____
 As $x \rightarrow -\infty$, $f(x) \rightarrow$ _____
 As $x \rightarrow +\infty$, $f(x) \rightarrow$ _____
 AROC from (2, _____) to (0, _____)

April 10, 2019, Wednesday

SAMPLE ITEMS

1. What are the zeros of the function represented by the quadratic expression $2x^2 + x - 3$?

A. $x = \frac{3}{2}$ and $x = 1$
 B. $x = -\frac{2}{3}$ and $x = 1$
 C. $x = -1$ and $x = \frac{2}{3}$
 D. $x = -1$ and $x = \frac{3}{2}$

4. The expression $-x^2 + 70x - 600$ represents a company's profit for selling x items. For which number(s) of items sold is the company's profit equal to \$0?

A. 0 items
 B. 35 items
 C. 10 items and 60 items
 D. 20 items and 30 items

2. What is the vertex of the graph of $f(x) = x^2 + 10x - 9$?

A. (5, 66)
 B. (5, -9)
 C. (-5, -9)
 D. (-5, -34)

STANDARD FORM of QUADRATICS
 $y = ax^2 + bx + c$

VERTEX FORM of QUADRATICS
 $y = a(x-h)^2 + k$

VERTEX → STANDARD FORM

step 1. Expand the square binomial & rewrite the equation.

step 2. Multiply the two binomials & combine like terms (using the BOX, distributive, or FOIL method).

step 3. Distribute if necessary & combine like constants terms.

STANDARD → VERTEX FORM

EXAMPLE: $y = 2(x-1)^2 - 4$

EXAMPLE: $y = 2x^2 + 12x - 4$

step 1. Identify a, b, & c.
 $a = \dots, b = \dots, c = \dots$

step 2. Find the line of symmetry or 'h' by using $h = \frac{-b}{2a}$.

step 3. Find the y-value of the vertex or 'k' by substituting 'x' into the equation.

step 4. Write the equation in vertex form using the 'h' and 'k' found above. The 'a' will be the 'a' found in step 1.

Algebra 1 - U3C Day 3

Convert VERTEX → STANDARD Form Notes

Examples:

1) $y = (x+3)^2 + 4$ 3) $y = 2(x+3)^2 - 5$ 5) $y = 2(x+1)^2 - 2$

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

Converting STANDARD → VERTEX Form Notes

Examples:

1) $y = x^2 + 8x + 10$ 3) $y = x^2 + 10x + 20$ 5) $y = -x^2 - 2x + 3$

2) $y = x^2 + 8x + 1$ 4) $y = -2x^2 - 16x - 32$

Algebra 1 - U3C Day 3

Name _____

Convert Vertex to Standard Form & Standard to Vertex Form

Convert from Vertex form to Standard form for each equation below.

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

3) $f(x) = (x+4)^2 - 1$ 4) $f(x) = (x+2)^2 + 2$

5) $f(x) = (x-3)^2 + 2$ 6) $f(x) = (x+2)^2 - 1$

7) $f(x) = (x+3)^2 - 1$ 8) $f(x) = (x+2)^2 + 4$

9) $f(x) = -2(x-4)^2 - 4$ 10) $f(x) = -2(x-3)^2 + 4$

Convert from Standard form to Vertex form for each equation below.

11) $f(x) = x^2 - 8x + 13$ 12) $f(x) = x^2 - 8x + 12$

13) $f(x) = x^2 + 6x + 10$ 14) $f(x) = x^2 + 2x - 1$

15) $f(x) = x^2 + 6x + 7$ 16) $f(x) = x^2 - 8x + 18$

17) $f(x) = x^2 - 6x + 12$ 18) $f(x) = x^2 - 8x + 14$

19) $f(x) = -x^2 + 2x - 2$ 20) $f(x) = 2x^2 + 12x + 20$

Algebra 1

Name _____ ID: 1

TOTD - Converting Quadratic Functions

Convert the given equations from vertex form to standard form.

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

Convert the given equations from standard form to vertex form.

3) $y = x^2 - 8x + 18$ 4) $y = -3x^2 - 18x - 28$

Study Guide Unit 3C

Name _____

5. Convert $y = x^2 + 4x + 4$ to vertex form, then identify the vertex and the graph.

6. What is the vertex and axis of symmetry of the quadratic $y = 2(x-1)^2 + 4$?

A (-4, 1); x = 1 B (4, 1); x = 4
 C (2, 4); x = 4 D (1, 4); x = 1

7. Convert the following equation into vertex form: $y = x^2 - 8x + 13$

8. Convert the following equation into standard form: $y = -2(x-4)^2 - 4$

Study Guide Unit 3C Name _____

Find the a. vertex, b. axis of symmetry, and c. x-intercepts, and d. y-intercept of each quadratic function from its graph.

a. Vertex: _____
 b. Axis of symmetry: $x =$ _____
 c. x-intercept(s): _____
 d. y-intercept: _____

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

x	f(x)
-1	
0	
1	
2	
3	

Transformations: _____

T-intercept: _____ Axis of Symmetry: _____

April 11, 2019, Thursday

SAMPLE ITEM

1. A certain population of bacteria has an average growth rate of 2%. The formula for the growth of the bacteria's population is $A = P_0 \cdot 1.02^t$, where P_0 is the original population and t is the time in hours.

If you begin with 200 bacteria, about how many bacteria will there be after 100 hours?

A. 7
 B. 272
 C. 1,449
 D. 20,000

2. The points (0, 1), (1, 5), (2, 25), and (3, 125) are on the graph of a function. Which equation represents that function?

A. $f(x) = 2^x$
 B. $f(x) = 3^x$
 C. $f(x) = 4^x$
 D. $f(x) = 5^x$

...quiz

Algebra I Additional Practice Items

Item 17

Extended Constructed-Response

Part A What are the zeros of the function $f(x) = x^2 - 6x + 8$? Explain how you determined your answer. Write your answer in the space provided.

Part B Explain how you know that the function $g(x) = x^2 - 6x + 10$ has a minimum value and not a maximum value. Find the minimum value of the function. Write your answer in the space provided.

Part A _____

Part B _____

Georgia Milestones Algebra I EOC Study/Resource Guide for Students and Parents Page 237 of 258
 Copyright © 2018 by Georgia Department of Education. All rights reserved.

Additional Practice Items Scoring Rubrics and Exemplar Responses

Item 17

Exemplar Response

Points Awarded	Sample Response
4	<p>Part A: The zeros are 2 and 4.</p> <p>AND</p> <p>To find the zeros, I set the value of the function equal to 0. Then I factored the quadratic expression on the right side of the equation. Next, I used the Zero Product Property to set each factor equal to 0. Then I solved each of the resulting equations for x. These values of x are the zeros of the function. Or other valid explanation.</p> <p>Part B: The coefficient of the x^2 is positive, so the function opens up, which means it has a minimum value instead of a maximum. Or other valid explanation.</p> <p>AND</p> <p>The minimum value of the function is 1.</p>
3	The student correctly answers three of the four parts.
2	The student correctly answers two of the four parts.
1	The student correctly answers one of the four parts.
0	Response is irrelevant, inappropriate, or not provided.

Note: If a student makes an error in one part that is carried through to subsequent parts, then the student is not penalized again for the same error.

Georgia Milestones Algebra I EOC Study/Resource Guide for Students and Parents Page 254 of 258
 Copyright © 2018 by Georgia Department of Education. All rights reserved.

April 12, 2019, Friday

Constructed-Response

The first four terms of a sequence are shown.

16, 48, 144, 432, ...

What is the explicit function, $f(n)$, that defines the sequence? Explain how you determined your answer. Write your answer in the space provided.

Match the given characteristics to the given graphs, then identify the Name & Part

Graph: _____	Graph: _____
Domain: $(-\infty, 0)$	Domain: $(-\infty, 0)$
Range: $[-2, \infty)$	Range: _____
Vertex: _____	Vertex: _____
Axis of Symmetry: _____	Axis of Symmetry: $x = 2$
Zeros: _____	Zeros: _____
y-intercept: _____	y-intercept: $(0, 10)$
Int of Increase: $(2, \infty)$	Int of Increase: _____
Int of Decrease: $(-\infty, 2)$	Int of Decrease: _____
Extrema: _____ at _____	Extrema: MIN @ $(2, 2)$
End Behavior: _____	End Behavior: _____
As $x \rightarrow -\infty, f(x) \rightarrow$ _____	As $x \rightarrow -\infty, f(x) \rightarrow$ _____
As $x \rightarrow \infty, f(x) \rightarrow$ _____	As $x \rightarrow \infty, f(x) \rightarrow$ _____
Transformations: Stretch 2, Right 2, Down 2	Transformations: _____
Graph: _____	Graph: _____
Domain: $(-\infty, 0)$	Domain: $(-\infty, \infty)$
Range: _____	Range: $(-\infty, 2]$
Vertex: _____	Vertex: _____
Axis of Symmetry: _____	Axis of Symmetry: $x = -3$
Zeros: _____	Zeros: _____
y-intercept: $(0, 0)$	y-intercept: _____
Int of Increase: _____	Int of Increase: _____
Int of Decrease: _____	Int of Decrease: _____
Extrema: _____ at _____	Extrema: _____ at _____
End Behavior: _____	End Behavior: _____
As $x \rightarrow -\infty, f(x) \rightarrow \infty$	As $x \rightarrow -\infty, f(x) \rightarrow \infty$
As $x \rightarrow \infty, f(x) \rightarrow -\infty$	As $x \rightarrow \infty, f(x) \rightarrow -\infty$
Transformations: _____	Transformations: _____
Reflects x-axis, Right 2, Up 4	

<p>A. $y = -2(x+3)^2 + 2$</p>	<p>B. $y = 2(x-2)^2 - 2$</p>
<p>C. $y = -(x-2)^2 + 4$</p>	<p>D. $y = -(x-1)^2 + 1$</p>
<p>E. $y = (x-1)^2 + 4$</p>	<p>F. $y = 2(x-2)^2 + 2$</p>

Algebra 1 - U3C Day 4 Unit 3C Test Review Part 1 Name _____

Graph the following equation. Then, write the characteristics for the graph.

<p>1. $2(x+1)^2 - 5$</p>	<p>2. $y = -x^2 + 4x$</p>
-------------------------------------	--------------------------------------

Describe the transformations to the parent function in the given equations.

3. $y = -(x+2)^2 - 5$	4. $y = 3(x-4)^2 + 2$
-----------------------	-----------------------

Write the quadratic equation of the graph that has been...

5. shifted down 1 and shrunk by a factor of $\frac{1}{3}$	6. reflected over the x-axis and has shifted right 2
---	--

Change the equations to standard form.

7. $y = 2(x-1)^2 + 4$	8. $y = (x+4)^2 - 6$
-----------------------	----------------------

Change the equations to vertex form.

9. $y = x^2 + 6x - 2$	10. $y = x^2 + 8x + 1$
-----------------------	------------------------

11. What is the vertex and axis of symmetry of the quadratic $y = 2(x-3)^2 + 4$?

- (2, -3); $x = -3$
- (3, 4); $x = 4$
- (3, 4); $x = 3$
- (4, 3); $x = 4$

12. Identify the vertex of $f(x) = x^2 + 10x - 9$?

- (5, 66)
- (5, -9)
- (-5, -9)
- (-5, -34)

13. Which function is shown in the graph?

- $f(x) = x^2 - 3x - 10$
- $f(x) = x^2 + 2x - 10$
- $f(x) = x^2 + x - 12$
- $f(x) = x^2 - 5x - 8$

14. Tell whether the graph of the quadratic function $y = -2x^2 - 5x + 15$ opens up or down, and why.

- Because $a < 0$, the parabola opens down.
- Because $a < 0$, the parabola opens up.
- Because $a > 0$, the parabola opens down.
- Because $a > 0$, the parabola opens up.