Algebra I Average/Honors

Assignment- Characteristics of Quadratics

Hello everyone! Below you will find a list of the different topics that will be covered over the next two weeks. For this section of time, we are covering the Characteristics of Quadratics. While we don't currently have specifics on exactly how the grading process will work, we can assure you that by completing all of the work provided to you for the remainder of the school year, it can only improve your grade. Any work completed from this point forward, cannot negatively impact you in any way. While you may be happy with your current average and decide to opt out of doing the work that is being provided to you, it is strongly encouraged that you complete every assignment as it will prepare you for future math courses. Below you will find links to each skill that would have been tested over for Test 6. Please watch the following videos listed below. In Schoology you will see an assignment loaded that is called Characteristics of Quadratics. Make sure that you complete either the paper packet (make sure to mark your answers on the bubble sheet provided at the end of the packet) or the online portion of this assignment in Schoology, in order to receive any additional credit for the course. (Reminder, if you do not do any additional work, your grade will stand as what it was at the end of 3rd 9 weeks. In order to improve your grade, you must complete the assignments you will be receiving throughout the remainder of the school year). In Schoology you will have an unlimited number of attempts to complete the assignment for the best possible grade. Remember, the grades will not be added into infinite campus until after we have received further instructions on how grades will be counted. Your individual teacher will be available to answer any and all questions you may have so please feel free to contact them through Remind or through their school email which are listed on the BHS web page under teacher websites.

Watch the following videos:

You will need to first be familiar with Standard Form ($ax^2 + bx + c$) and Vertex Form ($y = a(x - h)^2 + k$) and how to convert between the two of them.

Standard Form

Vertex Form

How to convert from Standard form to Vertex Form

How to convert from Vertex form to Standard Form

Once you know how to convert between the two different forms, you need to be able to find the following: Axis of Symmetry, Vertex, Domain, Range, End Behaviors, Min, Max, X-intercepts, Y-intercepts, transformations, Intervals of Increase and Decrease. Then you need to be able to identify whether a function is Even/Odd/ or Neither, and last for this week, you need to be able to do Average rate of Change for Quadratics. I have provided different videos to watch for different skills so just watch whichever one is easiest for you to understand

1. How to find the Axis of Symmetry and Vertex.
   a. Video 1
   b. Video 2
   c. Video 3
2. How to graph a quadratic equation.
   a. Notes- https://www.wikihow.com/Graph-a-Quadratic-Equation
   b. Video 1
   c. Video 2
3. How to find Domain and Range of a Quadratic Function.
   a. Video 1
   b. Video 2
4. How to find all of the Characteristics of a Quadratic Function.
   a. Video 1
   b. Video 2
5. End Behaviors of Linear and Quadratic Functions.
   a. Video 1
6. How to determine if a function is Even, Odd, or Neither.
   a. Graphically
   b. Algebraically
7. How to find Average Rate of Change for Quadratic Functions.
   a. Graphically
   b. Algebraically

Decatur County School District

Characteristics of Quadratics

Name: _____ Score: _____ / 100

Question 1 _____ /1

Use the quadratic formula to solve the equation. (All solutions are real numbers.)

$4n^2 = -12n - 3$

- ☐ $\left\{\frac{-3+\sqrt{6}}{8}, \frac{-3-\sqrt{6}}{8}\right\}$
- ☐ $\left\{\frac{-3+\sqrt{6}}{2}, \frac{-3-\sqrt{6}}{2}\right\}$
- ☐ $\left\{\frac{-12+\sqrt{6}}{2}, \frac{-12-\sqrt{6}}{2}\right\}$
- ☐ $\left\{\frac{-3+\sqrt{3}}{2}, \frac{-3-\sqrt{3}}{2}\right\}$

Question 2 _____ /1

Use the quadratic formula to solve the equation. (All solutions are real numbers.)

$3x(x + 1) = 2$

- ☐ $\left\{\frac{3+\sqrt{33}}{6}, \frac{3-\sqrt{33}}{6}\right\}$
- ☐ $\left\{\frac{-3+\sqrt{33}}{6}, \frac{-3-\sqrt{33}}{6}\right\}$
- ☐ $\left\{\frac{1}{5}\right\}$
- ☐ $\{1\}$

Question 3 _____ /1

Use the quadratic formula to solve the equation. (All solutions are real numbers.)

$a^2 + 14a + 40 = 0$

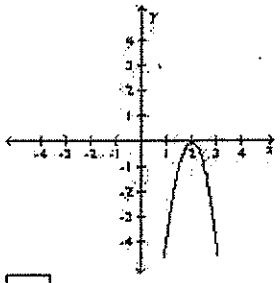
- ☐ $\{2\sqrt{10}, -2\sqrt{10}\}$
- ☐ {4, 10}
- ☐ {-10, -4}
- ☐ {-20, -8}

Name: _____

Question 4 /1

Determine the number of real-number solutions of the equation from the given graph.

$4x^2 + 16 = 16x$, given the graph of $y = 16x - 4x^2 - 16$



- [ ] 1
- [ ] 3
- [ ] 0
- [ ] 2

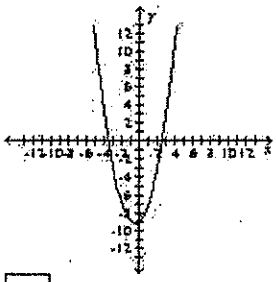
Name: _____

Question 5

/1

Determine the number of real-number solutions of the equation from the given graph.

$x^2 + x - 9 = 0$, given the graph of $y = x^2 + x - 9$



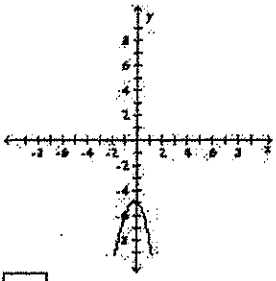
- [ ] 3
- [ ] 2
- [ ] 0
- [ ] 1

Name: _____

Question 6 /1

Determine the number of real-number solutions of the equation from the given graph.

$-2x^2 - x - 5 = 0$, given the graph of $y = -2x^2 - x - 5$



- ☐ 2
- ☐ 1
- ☐ 0
- ☐ 3

Question 7 /1

Factor.

$x^2 + 9x + 20$

- ☐ $(x - 4)(x + 5)$
- ☐ $(x - 4)(x + 1)$
- ☐ $(x + 4)(x + 5)$
- ☐ $x^2 + 9x + 20$

Name: _____

Question 8 /1

Factor using the slide and divide method.

$15x^2 + 26x + 8$

- ☐ $(3x - 4)(5x - 2)$
- ☐ $(3x + 4)(5x + 2)$
- ☐ $(15x + 4)(x + 2)$
- ☐ $(15x - 4)(x - 2)$

Question 9 /1

Factor using the slide and divide method.

$12x^2 + 7x - 12$

- ☐ $(3x + 4)(4x - 3)$
- ☐ $(12x + 4)(x - 3)$
- ☐ $(12x - 4)(x + 3)$
- ☐ $(3x - 4)(4x + 3)$

Question 10 /1

Solve the equation.

$x^2 - x = 72$

- ☐ $x = 8, 9$
- ☐ $x = -8, -9$
- ☐ $x = 1, 72$
- ☐ $x = -8, 9$

Name: _____

Question 11

/1

Solve the equation.

$x^2 + 7x - 44 = 0$

- [ ] x = 11, -4
- [ ] x = -11, 1
- [ ] x = -11, 4
- [ ] x = 11, 4

Name: _____

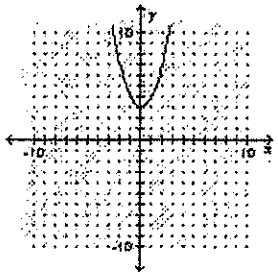
Question 12

/1

Identify which graph matches the equation.

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

☐



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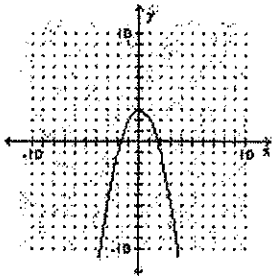

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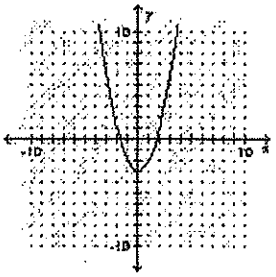

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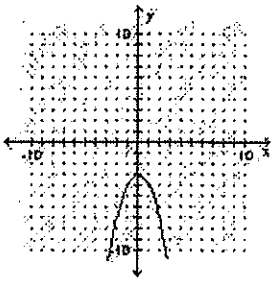
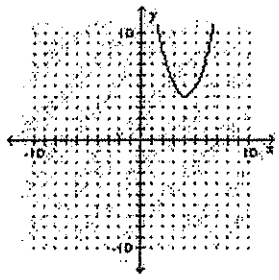


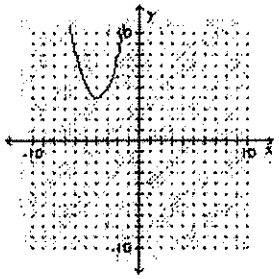
Name: _____

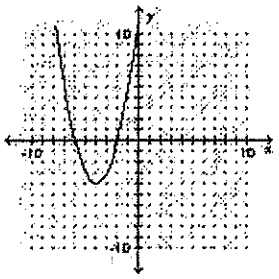
Question 13 /1

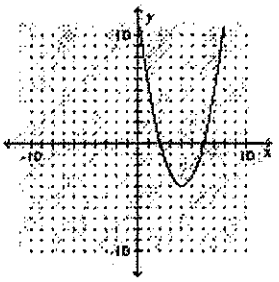
Identify which graph matches the equation.

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









Name: _____

Question 14 /1

Identify the vertex of the given parabola.

$f(x) = (x + 4)^2 + 4$

- ☐ (4, 0)
- ☐ (-4, -4)
- ☐ (0, 4)
- ☐ (-4, 4)

Question 15 /1

Identify the vertex of the given parabola.

$f(x) = x^2 + 9$

- ☐ (0, 9)
- ☐ (9, 0)
- ☐ (-9, 0)
- ☐ (0, -9)

Question 16 /1

Identify the vertex of the given parabola.

$f(x) = (x + 2)^2 + 4$

- ☐ (4, -4)
- ☐ (4, -2)
- ☐ (-4, 2)
- ☐ (-2, 4)

Name: _____

Question 17 /1

Identify the vertex of the given parabola.

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

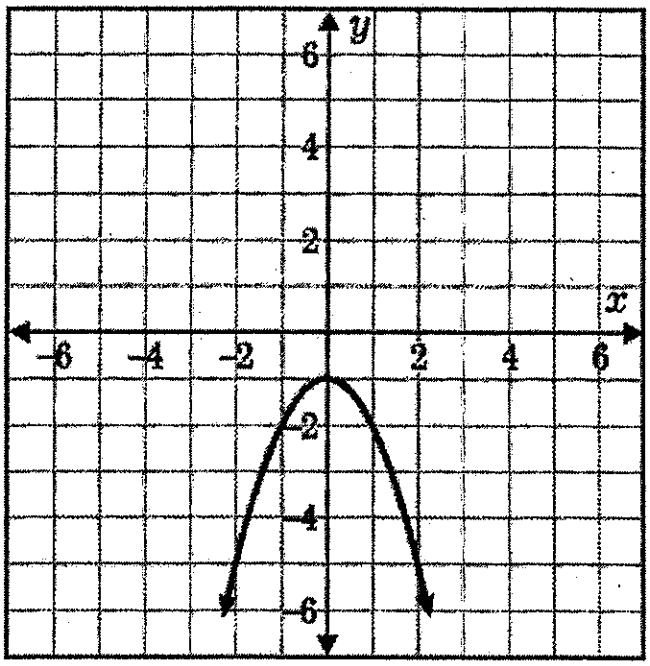
- ☐ (2, -8)
- ☐ (-2, 8)
- ☐ (-2, -8)
- ☐ (2, 8)

Name: _____

Question 18

/1

The graph of $y = -x^2 - 1$ is shown below.



What is the *maximum* y-value graphed?

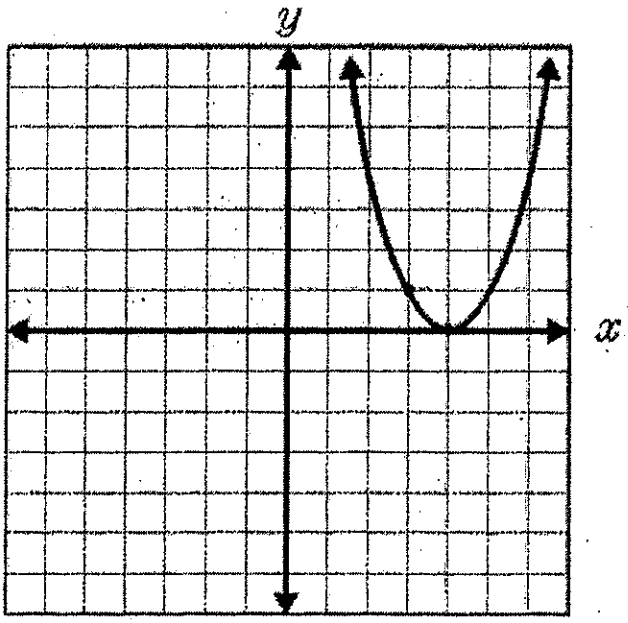
- ☐ 0
- ☐ −1
- ☐ −2
- ☐ 5

Name: _____

Question 19

/1

The graph of $y = (x-4)^2$ is shown below.



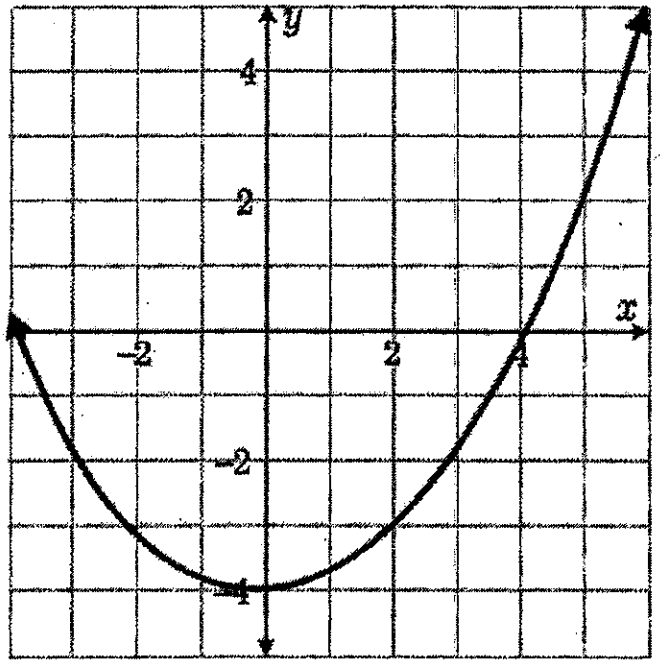
What is the *minimum* y-value graphed?

- ☐ 4
- ☐ 1
- ☐ 0
- ☐ 6

Name: _____

Question 20

/1

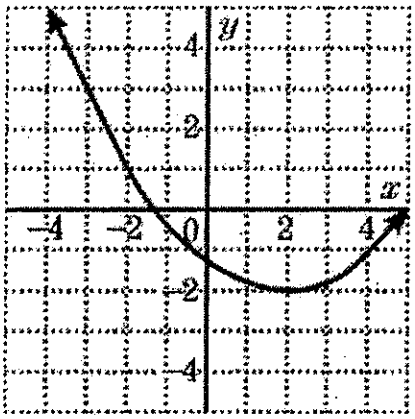


What is the domain of the function shown?

- ☐ $x \geq -4$
- ☐ $-4 < x < 6$
- ☐ $\{-4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6\}$
- ☐ all real numbers

Name: _____

Question 21 /1



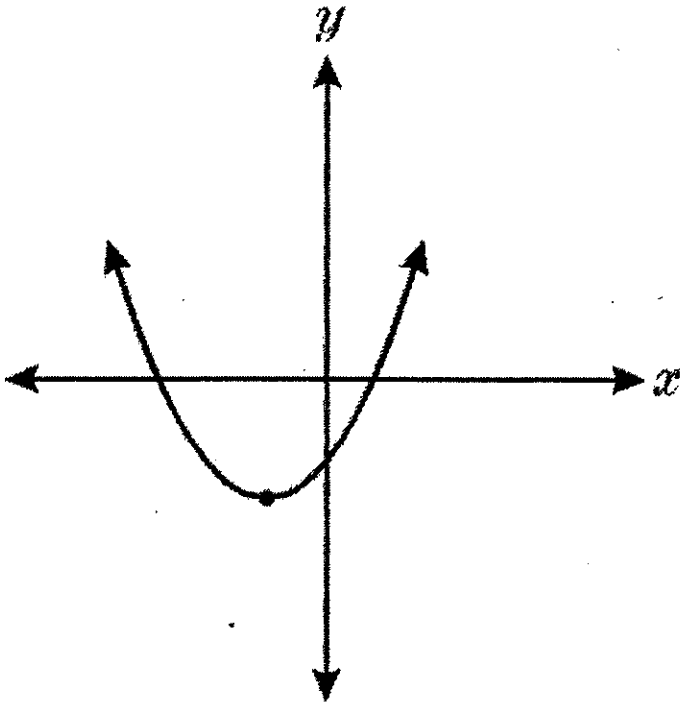
What is the range of the function shown?

- ☐ $y \geq -2$
- ☐ $-4 < x < 5$
- ☐ $\{-2, -1, 0, 1, 2, 3, 4, 5\}$
- ☐ all real numbers

Name: _____

Question 22 /1

How many solutions are shown by the graph of the quadratic function?



- [ ] zero
- [ ] one
- [ ] two
- [ ] three

Name: _____

Question 23 /1

The equation $y = -3x^2 + 4$ needs to be translated -12 units (vertically shifted down). Which equation describes the graph after it has undergone this translation?

- ☐ $y = 9x^2 + 16$
- ☐ $y = -3x^2 - 8$
- ☐ $y = -3x^2 + 16$
- ☐ $y = 9x^2 - 8$

Question 24 /1

If the given function $y = (x + 2)^2 - 1$ is shifted up 3 units, which equation describes the new function?

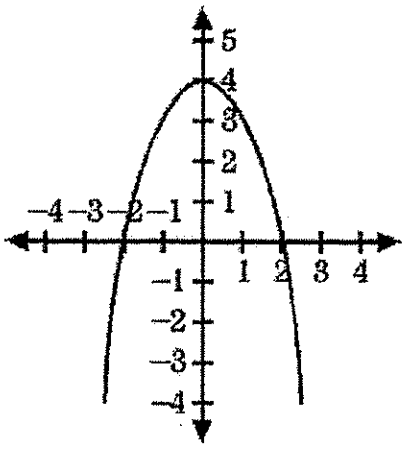
- ☐ $y = (x + 2)^2 + 2$
- ☐ $y = (x - 1)^2 - 1$
- ☐ $y = (x + 2)^2 - 4$
- ☐ $y = 3(x + 3)^2 - 1$

Name: _____

Question 25

/1

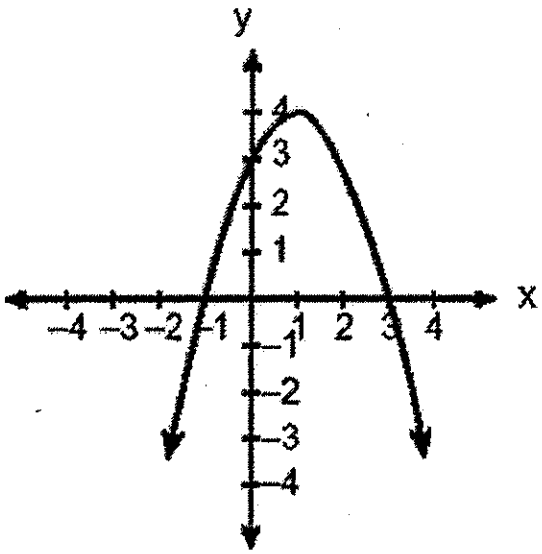
Which is an equation of the graph shown in the diagram?



- ☐ $x = -y^2 + 4$
- ☐ $y = -x^2 + 4$
- ☐ $y = x^2 - 4$
- ☐ $x = y^2 - 4$

Question 26 (1 point)

Which is an equation of the parabola shown in the accompanying diagram?



a. $y = x^2 - 2x + 3$

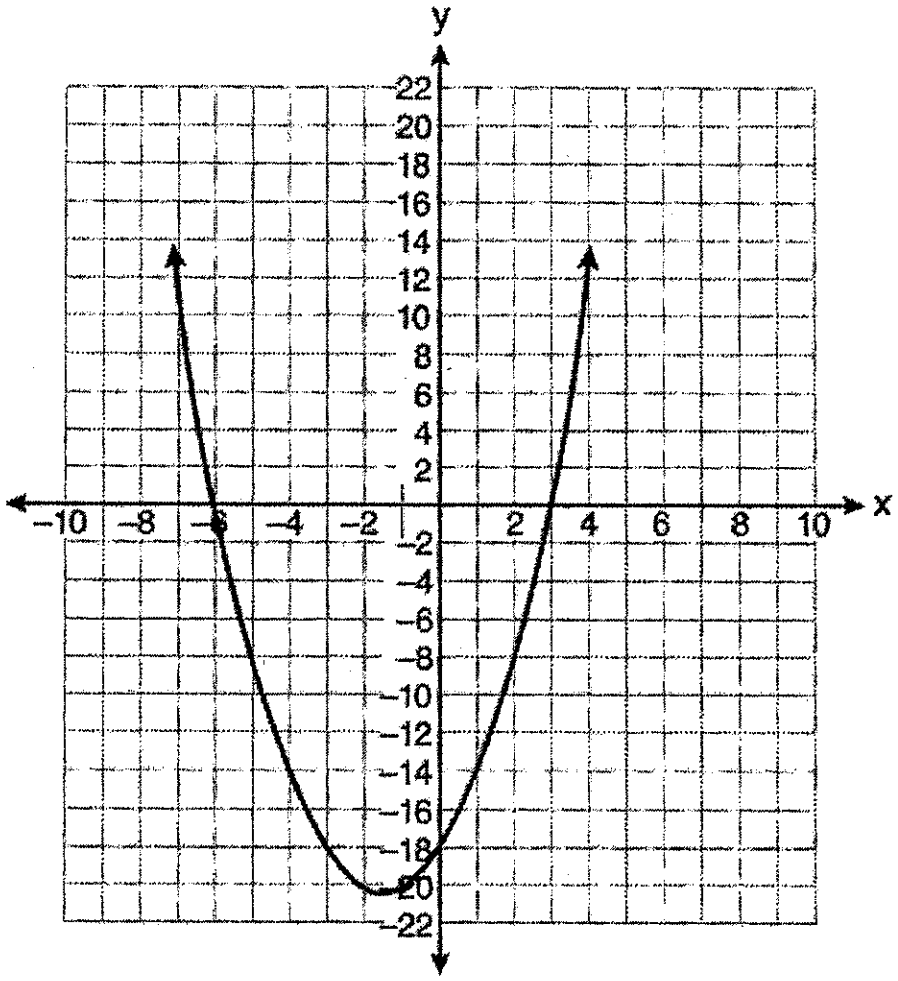
b. $y = x^2 + 2x + 3$

c. $y = -x^2 - 2x + 3$

d. $y = -x^2 + 2x + 3$

Question 27 (1 point)

The equation $y = x^2 + 3x - 18$ is graphed on the set of axes below.



Based on this graph, what are the roots of the equation $x^2 + 3x - 18 = 0$?

a. 3 and −6

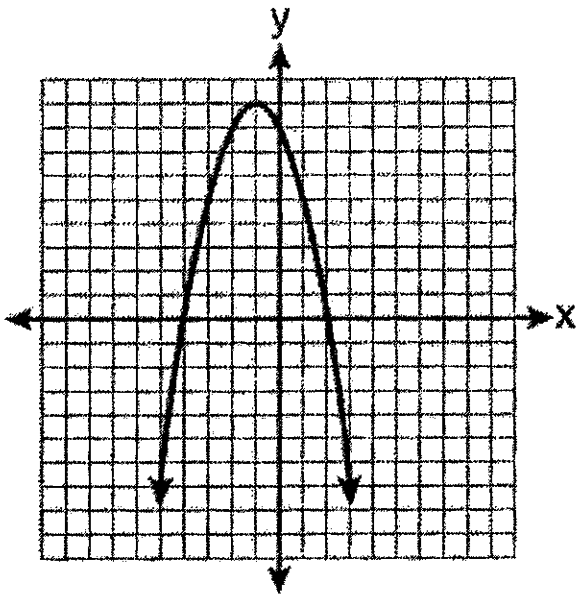
b. −3 and 6

c. 3 and −18

d. 0 and −18

Question 28 (1 point)

The equation $y = -x^2 - 2x + 8$ is graphed on the set of axes below.

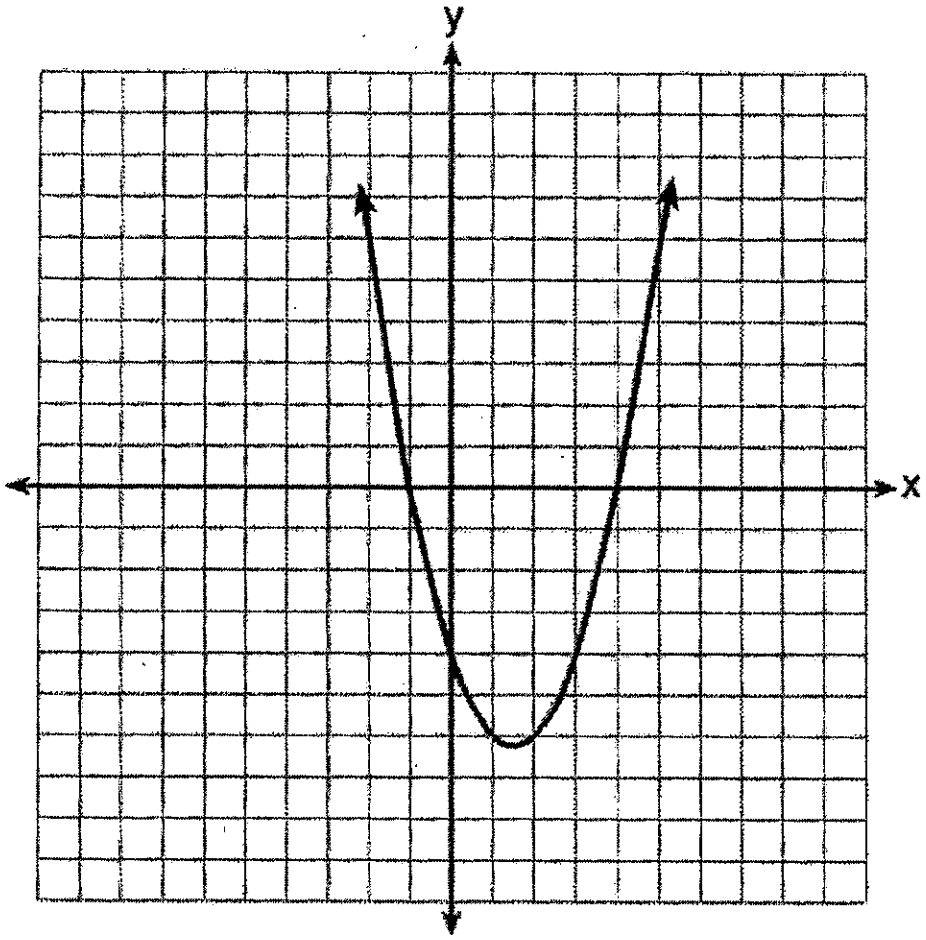


Based on this graph, what are the roots of the equation $-x^2 - 2x + 8 = 0$?

- a 2 and −4
- b 4 and −2
- c 8 and 0
- d 9 and −1

Question 29 (1 point)

The roots of a quadratic equation can be found using the graph below.



What are the roots of this equation?

a. −4 and −1

b. −4, −1, and 4

c. −1 and 4

d. −4, only

Question 30 (1 point)

What is the turning point, or vertex, of the parabola whose equation is $y = 3x^2 + 6x - 1$?

a. $(1, 8)$

b. $(-1, -4)$

c. $(-3, 8)$

d. $(3, 44)$

Question 31 (1 point)

What is the vertex of the graph of the equation $y = 3x^2 + 6x + 1$?

a. $(1, 10)$

b. $(-1, 10)$

c. $(-1, -2)$

d. $(1, -2)$

Question 32 (1 point)

Which is an equation of the axis of symmetry of the parabola whose equation is $y = 3x^2 - 12x - 13$?

a. $x = 4$

b. $x = 3$

c. $x = -4$

d. $x = 2$

Question 33 (1 point)

Which is an equation of the axis of symmetry of the parabola whose equation is $y = x^2 - 4x + 2$?

- a $x = 2$
- b $x = -2$
- c $y = 2$
- d $y = -2$

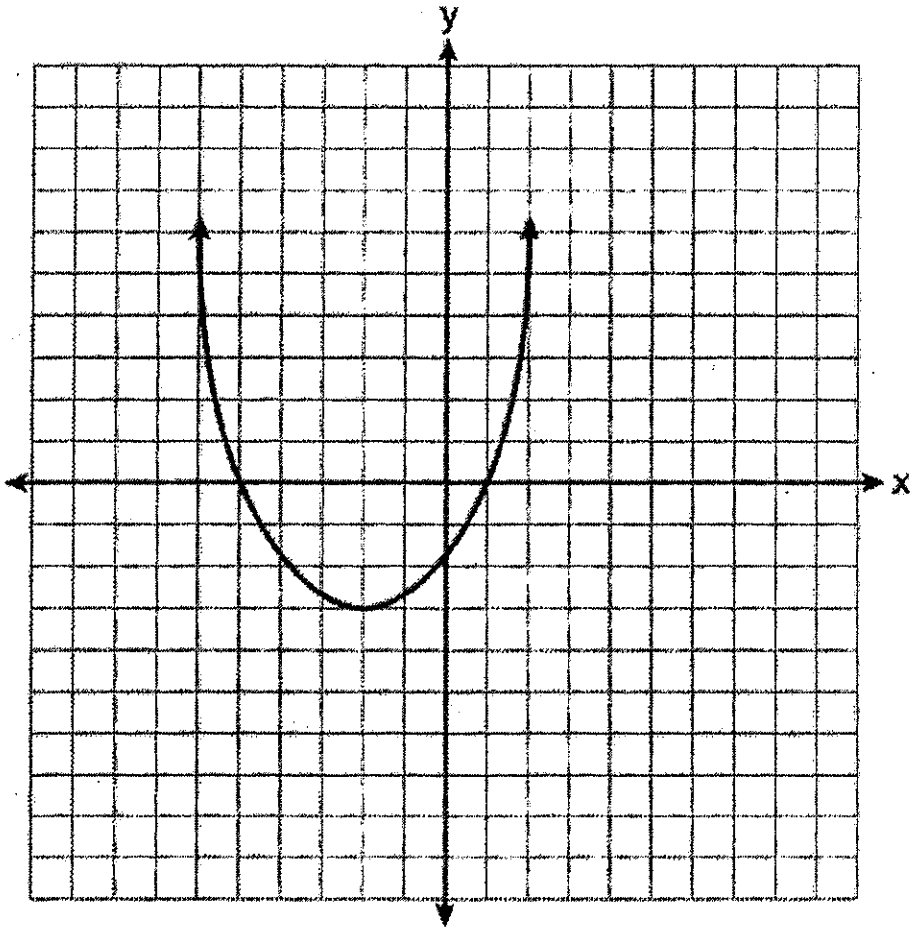
Question 34 (1 point)

Which is an equation of the axis of symmetry for the parabola whose equation is $y = 2x^2 + 8x - 1$?

- a $x = 2$
- b $x = -2$
- c $x = 4$
- d $x = -4$

Question 35 (1 point)

What are the vertex and the axis of symmetry of the parabola shown in the diagram below?



a. The vertex is $(-2, -3)$, and the axis of symmetry is $y = -2$.

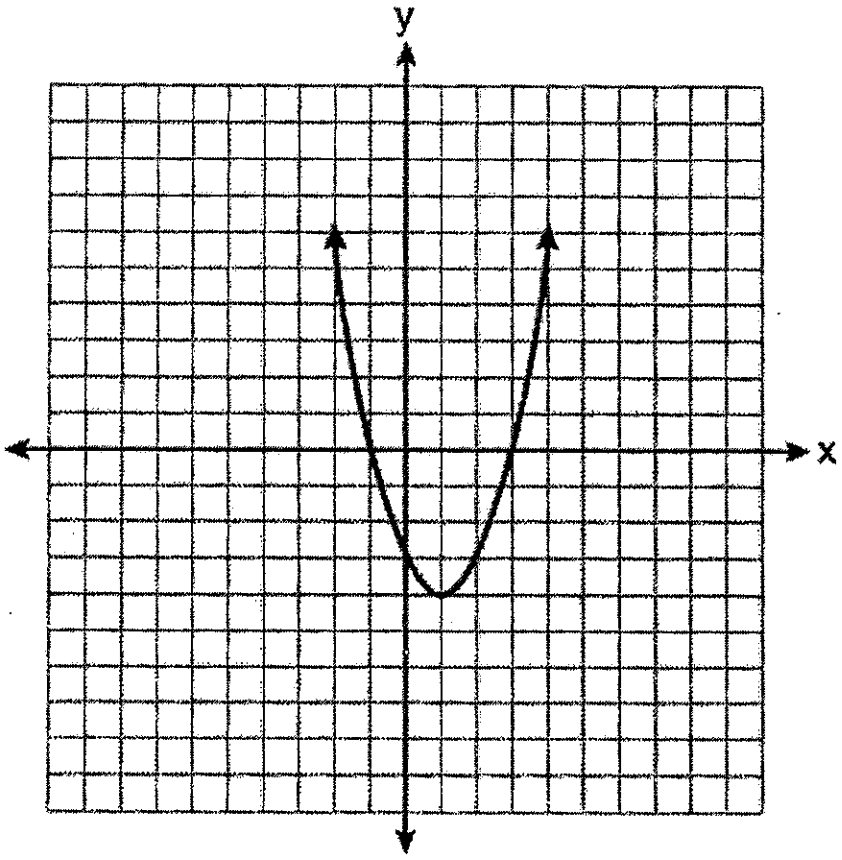
b. The vertex is $(-2, -3)$, and the axis of symmetry is $x = -2$.

c. The vertex is $(-3, -2)$, and the axis of symmetry is $y = -2$.

d. The vertex is $(-3, -2)$, and the axis of symmetry is $x = -2$.

Question 36 (1 point)

What are the vertex and axis of symmetry of the parabola shown in the diagram below?



a. vertex: $(-4, 1)$; axis of symmetry: $x = -4$

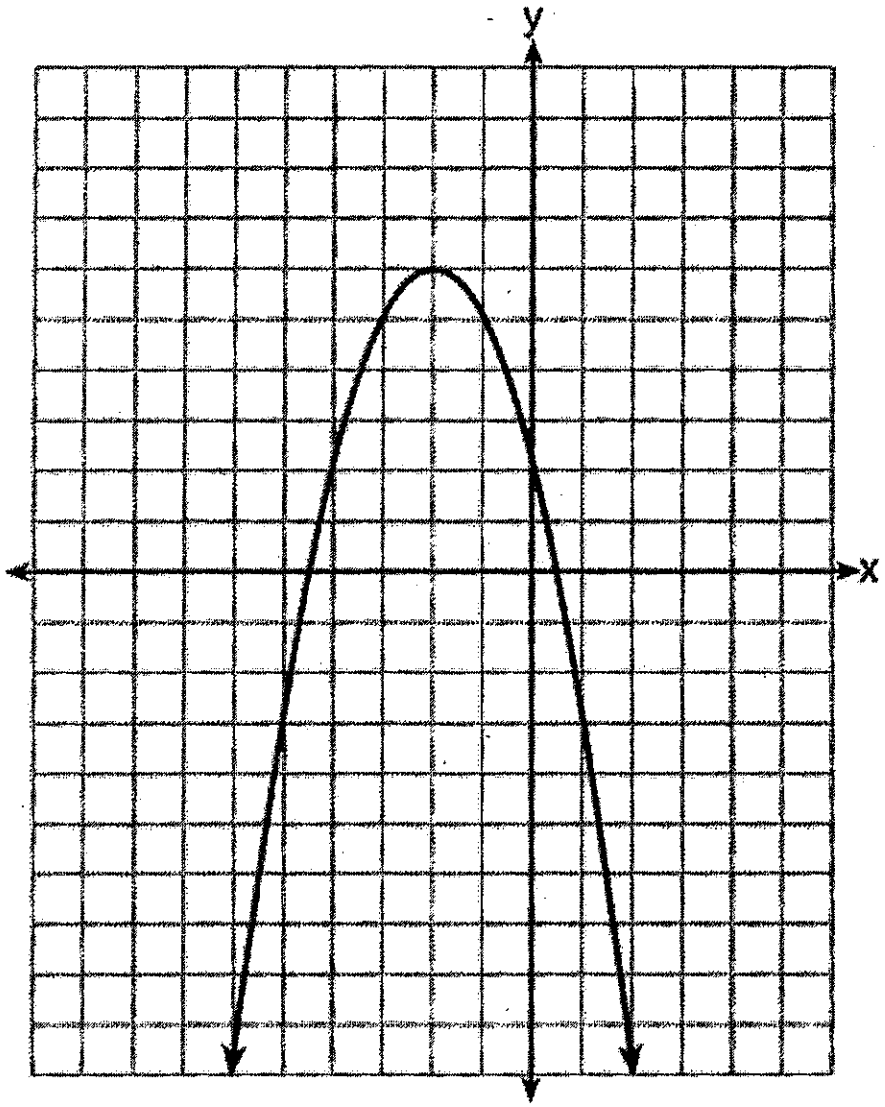
b. vertex: $(-4, 1)$; axis of symmetry: $x = 1$

c. vertex: $(1, -4)$; axis of symmetry: $x = -4$

d. vertex: $(1, -4)$; axis of symmetry: $x = 1$

Question 38 (1 point)

What are the coordinates of the vertex and the equation of the axis of symmetry of the parabola shown in the graph below?



a. $(-2, 6)$ and $y = -2$

b. $(-2, 6)$ and $x = -2$

c. $(0, 2)$ and $x = 2$

d. $(0, 2)$ and $y = 2$

Question 39 (1 point)

Is the function below an even, odd, or neither.

$3x^2+2x+3$

- a even
- b odd
- c neither

Question 40 (1 point)

Is the function below an even, odd, or neither?

$9x^5+6x^3+5x$

- a even
- b odd
- c neither

Name_____ Assignment Characteristics of Quadratics

		A	B	C	D		A	B	C	D
1.		○	○	○	○	21.	○	○	○	○
2.		○	○	○	○	22.	○	○	○	○
3.		○	○	○	○	23.	○	○	○	○
4.		○	○	○	○	24.	○	○	○	○
5.		○	○	○	○	25.	○	○	○	○
6.		○	○	○	○	26.	○	○	○	○
7.		○	○	○	○	27.	○	○	○	○
8.		○	○	○	○	28.	○	○	○	○
9.		○	○	○	○	29.	○	○	○	○
10.		○	○	○	○	30.	○	○	○	○
11.		○	○	○	○	31.	○	○	○	○
12.		○	○	○	○	32.	○	○	○	○
13.		○	○	○	○	33.	○	○	○	○
14.		○	○	○	○	34.	○	○	○	○
15.		○	○	○	○	35.	○	○	○	○
16.		○	○	○	○	36.	○	○	○	○
17.		○	○	○	○	37.	○	○	○	○
18.		○	○	○	○	38.	○	○	○	○
19.		○	○	○	○	39.	○	○	○	○
20.		○	○	○	○	40.	○	○	○	○