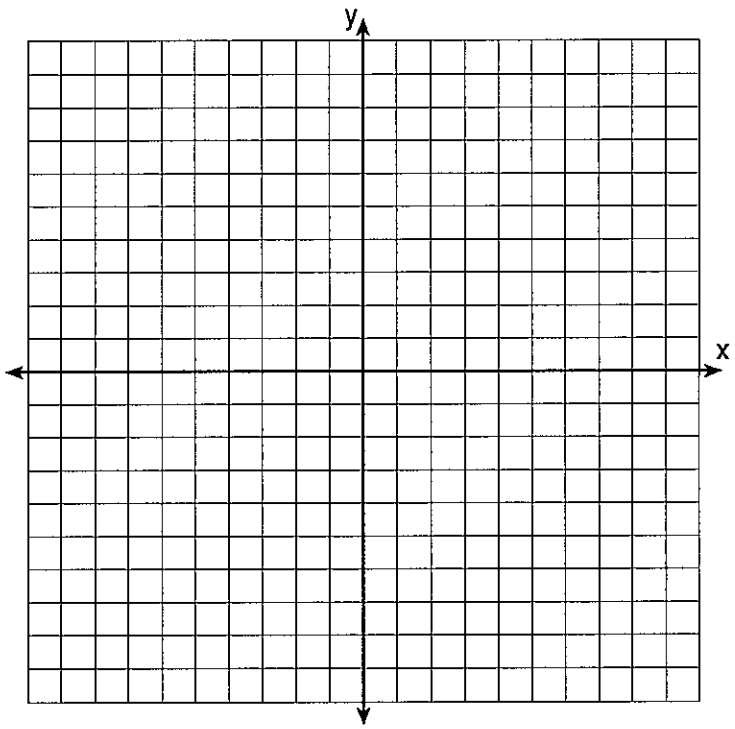
Name: _____ Date:_____

8A; Algebra 1 Period_____

Review for Parabola and Absolute Value Test



1) (a) Draw a graph of the equation $y = -x^2 + 4x - 3$ for all values of x such that $-1 \le x \le 5$.

(b) On the same set of axes, draw the graph of $y + 1 = x$.

(c) Using the graphs drawn in *parts (a)* and *(b)*, determine the solution of the system:

$$y = -x^2 + 4x - 3$$
$$y + 1 = x$$

2) Solve the following system of equations for the positive value of y.

$$x = 2y$$
$$x + y^2 = 15$$

3) Solve the following system of equations algebraically and check:

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

4) Solve the following system of equations algebraically and check:

$y = x^2 + 3x + 4$
$y - x = 7$

5) What is a solution for the following system of equations?

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

A) (-2,4) C) (2,4)
B) (-6,24) D) (6,36)

6) Solve the following system of equations for the positive value of x.

$y = x$
$y = x^2$

7) The graphs of the equations $y = x^2 - 4x - 1$ and $y + 3 = -x$ are drawn on the same set of axes. At what point do the graphs intersect?

A) (-1,4) C) (-1,-2)
B) (2,-5) D) (2,1)

8) The graphs of the equation $y = x^2$ and $y = 2x$ intersect in two points, one of which is the origin. What are the coordinates of the other point?

A) (1,2) C) (2,1)
B) (4,2) D) (2,4)

9) If the roots of a quadratic equation are 5 and 3, write the equation in $ax^2 + bx + c = 0$ form.

10) Which quadratic equation has -2 and 3 as its roots?

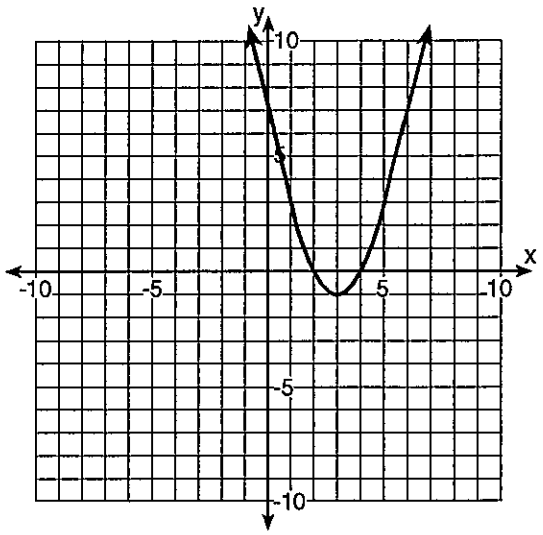
A) $x^2 + x - 6 = 0$
B) $x^2 - x - 6 = 0$
C) $x^2 + 5x + 6 = 0$
D) $x^2 - 5x + 6 = 0$

11) If the root of a quadratic equation is 4, write the equation in $ax^2 + bx + c = 0$ form.

12) An equation whose roots are 4 and -1 is

A) $x^2 + 3x + 4 = 0$
B) $x^2 - 3x + 4 = 0$
C) $x^2 + 3x - 4 = 0$
D) $x^2 - 3x - 4 = 0$

13) Which is an equation of the line of symmetry for the parabola in the accompanying diagram?



A) $x = 3$
B) $x = 2$
C) $x = 4$
D) $y = 3$

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

A) $x = -4$
B) $x = 2$
C) $x = 4$
D) $x = -2$

15) Find the equation of the axis of symmetry and the coordinates of the turning point for $y = -2x^2 - 4x + 6$.

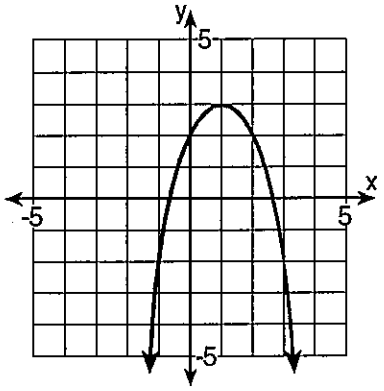
16) The coordinates of the turning point of the graph of $y = 2x^2 - 4x + 1$ are

A) (1,1)
B) (-1,5)
C) (1,-1)
D) (2,1)

17) The coordinates of the turning point of the graph of the equation $y = x^2 - 2x - 8$ are $(1,k)$. What is the value of k?

18) The equation of the axis of symmetry of a parabola is $x = 2$. If the parabola intersects the x-axis at the points whose coordinates are (-1,0) and $(k,0)$, find k.

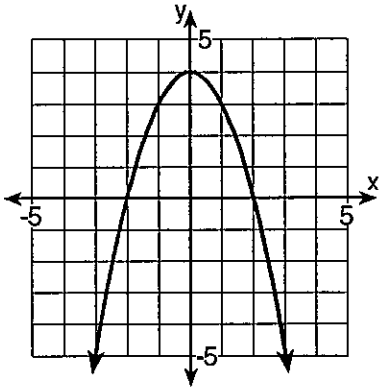
19)



Which of the following statements *best* describes given the graph?

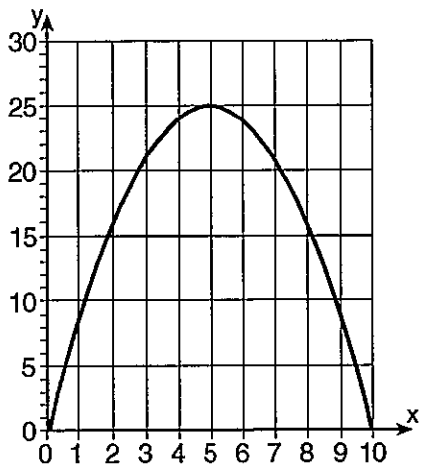
A) The maximum occurs when $y = 3$.
B) The axis of symmetry is $x = 3$.
C) An x-intercept is 3.
D) The axis of symmetry is $y = 1$.

20) Which of the following conclusions is accurate about the parabola below?



A) The axis of symmetry is the y-axis.
B) The minimum value is at (0,4).
C) The maximum value is at (2,0).
D) The vertex is at (4,0).

21) Which of the following statements is a valid conclusion concerning the graph of the parabola below?



A) The minimum value is at (0,0).
B) The axis of symmetry is $x = 25$.
C) The vertex of the parabola is at (10,0).
D) The maximum value is located at (5,25).

22) When the y-intercept of a quadratic equation is increased by two, what will happen to the graph of the equation?

A) It is shifted down 2 units.
B) It is shifted 2 units to the right.
C) It is shifted 2 units up.
D) It is shifted 4 units up.

23) Describe the shift in the vertex of the parabola in the graph of the function $y = x^2$ if it is changed to $y = x^2 - 3$.

A) The vertex shifts 3 units down.
B) The vertex shifts 3 units up.
C) The vertex shifts 3 units to the right.
D) The vertex shifts 3 units to the left.

24) What is the effect on the graph of the equation $y = -2x^2 + 1$ when the equation is changed to $y = 2x^2 + 1$?

A) The graph of $y = -2x^2 + 1$ is translated 4 units up.
B) The graph of $y = -2x^2 + 1$ is translated 4 units down.
C) The graph of $y = -2x^2 + 1$ is a reflection of $y = 2x^2 + 1$ over the line $y = 1$.
D) The graph of $y = -2x^2 + 1$ is a reflection of $y = 2x^2 + 1$ across the y-axis.

25) Which of the following functions will generate a graph that has been translated 5 units up from the graph of $y = x^2 + 4$?

A) $y = x^2 - 1$
B) $y = x^2 + 9$
C) $y = (x - 5)^2 + 4$
D) $y = x^2 + 5$

26) Eduardo graphs the functions $f(x) = x^2 + 5$ and $f(x) = \frac{1}{2}x^2 - 3$ on the same axes. Which of the following conclusions can be drawn about Eduardo's graphs of these equations?

A) The second graph is wider than the first graph and is translated down 8 units.
B) The second graph is narrower than the first graph and is translated down 3 units.
C) The second graph is narrower than the first graph and is translated down 8 units.
D) The second graph is wider than the first graph and is translated down 3 units.

27) Write the equation of a parabola whose graph is shifted 7 units down from the graph of $y = 3x^2 + 5$.

28) Which of the following equations will produce the *narrowest* parabola?

A) $y = -0.3x^2$
C) $y = 0.6x^2$
B) $y = \frac{3}{4}x^2$
D) $y = -\frac{1}{4}x^2$

29) What effect will changing $y = 2x^2 + 4$ to $y = 4x^2 + 4$ have on the graph of the original equation?

A) The parabola will shift 2 units up.
B) The parabola will be narrower.
C) The y-intercept is doubled.
D) The parabola will be wider.

30) The graph of the parabola $y = 2x^2 - 3$ is reflected in the x-axis. Which of the following equations *best* represents this transformation?

A) $y = -2x^2 + 3$
C) $y = 2x^2 + 3$
B) $y = -3x^2 + 2$
D) $y = -2x^2 - 3$

31) In order to slide the graph of $y = x^2 + 8$ down 5 units, which of the following changes should be made?

A) Change the 8 to 13.
B) Replace y with $(y - 5)$.
C) Change the 8 to 3.
D) Replace x with $(x - 5)$.

32) In the function $y = x^2 - 4$, the -4 is changed to a 3. What *best* describes the change in the turning point?

A) 7 units down
C) 1 unit down
B) 1 unit up
D) 7 units up

33) How would the graph of the function $y = x^2 + c$ be affected if the value of the constant, c, were decreased by 5?

A) The graph would be shifted to the left by 5 units.
B) The graph would be shifted down 5 units.
C) The graph would be shifted up 5 units.
D) The graph would be shifted to the right by 5 units.

34) What will be the equation of the resulting graph if the graph of $y = |x|$ is shifted 3 units up?

A) $y = |x| - 3$
C) $y = |x + 3|$
B) $y = |x - 3|$
D) $y = |x| + 3$

35) What will be the equation of the resulting graph if the graph of $y = |x|$ is shifted 3 units to the left?

A) $y = |x - 3|$
C) $y = |x| - 3$
B) $y = |x| + 3$
D) $y = |x + 3|$

36) When compared to the graph of $y = |x|$, the graph of $y = |x| - 8$ is

A) shifted to the left 8 units
B) shifted down 8 units
C) shifted up 8 units
D) shifted to the right 8 units

37) The graph of $y = |x|$ for $x \leq 0$ is a

A) ray
C) line
B) line segment
D) parabola

38) Write the equation of the parabola that opens downwards, has a vertex V(1,5), and is congruent to $y = -\frac{1}{4}x^2$. [*Place the answer in the form* $y = a(x - h)^2 + k$.]

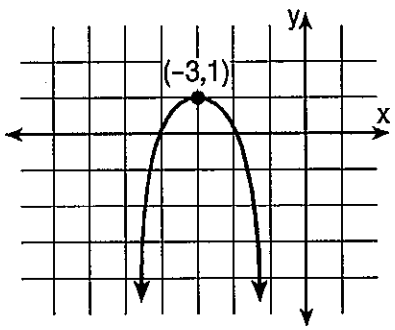
A) $y = -\frac{1}{4}(x + 1)^2 - 5$

B) $y = -\frac{1}{4}(x - 1)^2 + 5$

C) $y = -\frac{1}{4}(x - 1)^2 - 5$

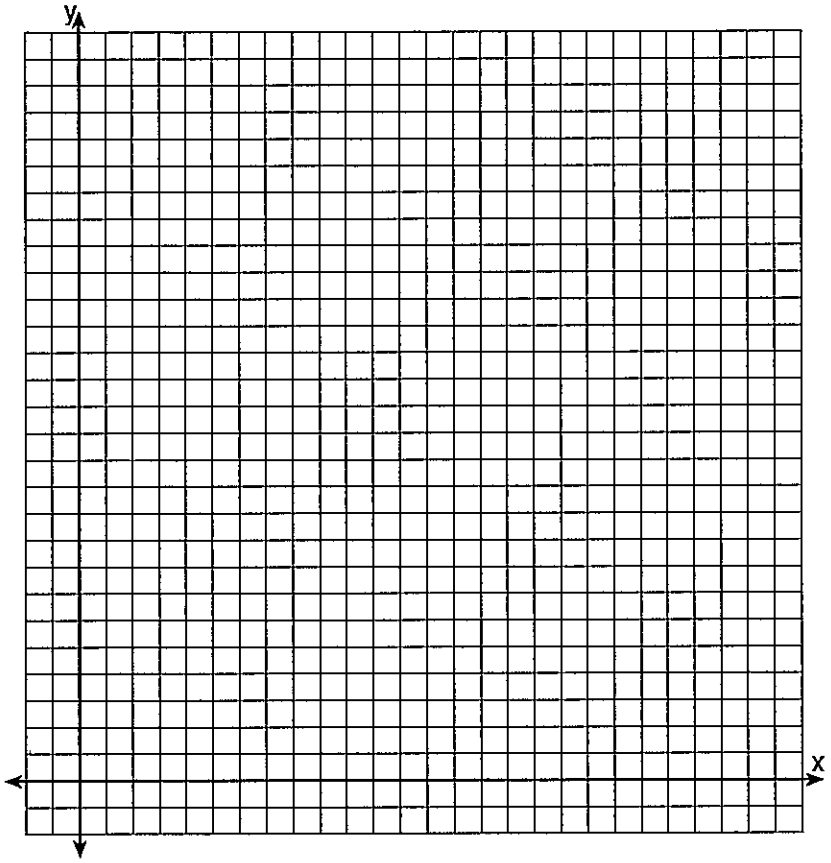
D) $y = -\frac{1}{4}(x + 1)^2 + 5$

39) Which equation represents the parabola shown in the graph below?



A) $f(x) = -(x - 3)^2 - 3$
B) $f(x) = -(x - 3)^2 + 1$
C) $f(x) = -(x + 3)^2 + 1$
D) $f(x) = (x + 1)^2 - 3$

40) A rocket is launched from the ground and follows a parabolic path represented by the equation $y = -x^2 + 10x$. At the same time, a flare is launched from a height of 10 feet and follows a straight path represented by the equation $y = -x + 10$. Using the accompanying set of axes, graph the equations that represent the paths of the rocket and the flare, and find the coordinates of the point or points where the paths intersect. [*Show all work.*]

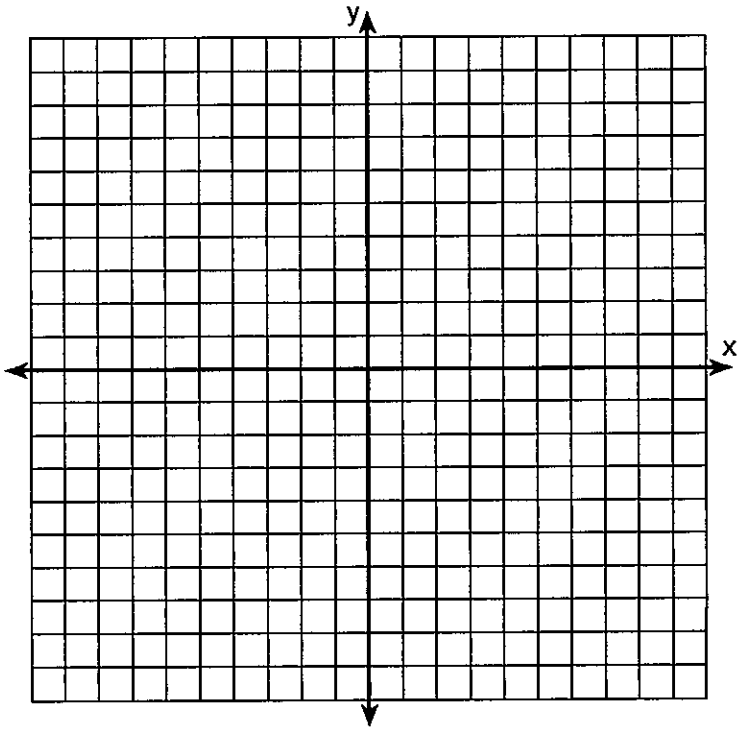


41) Without using a calculator, determine the vertex of the following parabola. Show all work!
Solve by completing the square!

$y = x^2 - 10x + 27$

42) (a) On the set of axes below, graph and label the equations $y = |x|$ and $y = 3|x|$ for the interval $-3 \leq x \leq 3$.

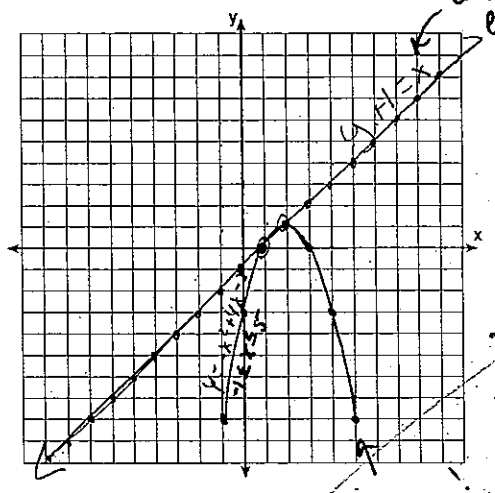
(b) Explain how changing the coefficient of the absolute value from 1 to 3 affects the graph.



Name: Key Date:

Algebra 1 Period

Review for Parabola and Absolute Value Test



a)

x	y
-1	-8
0	-3
1	0
2	1
3	0
4	-3
5	-8

b) $y + 1 = x$, $-1 \quad -1$, $y = x - 1$, m: $\frac{1}{1}$ ↑ →, B: -1

All answers! B/C constraints are given!

1) (a) Draw a graph of the equation $y = -x^2 + 4x - 3$ for all values of x such that $-1 \le x \le 5$.

(b) On the same set of axes, draw the graph of $y + 1 = x$.

(c) Using the graphs drawn in *parts (a)* and *(b)*, determine the solution of the system:

$y = -x^2 + 4x - 3$
$y + 1 = x$

(1, 0) (2, 1)

2) Solve the following system of equations for the positive value of y.

$x = 2y$
$x + y^2 = 15$
$-y^2 \quad -y^2$
$x = -y^2 + 15$

$2y = -y^2 + 15$
$+y^2 - 15 \quad +y^2 - 15$
$y^2 + 2y - 15 = 0$
$(y + 5)(y - 3) = 0$

$y + 5 = 0$	$y - 3 = 0$
$-5 \quad -5$	$+3 \quad +3$
$y = -5$	$y = 3$

Reject this.

$y = 3$

3) Solve the following system of equations algebraically and check: ✱ make sure to check on the test!

Checks on last page

$y = 2x^2 + 2x + 3$
$x = y - 3$
$+3 \quad +3$
$y = x + 3$

$2x^2 + 2x + 3 = x + 3$
$-x \quad -3 \quad -x - 3$
$2x^2 + x = 0$
$x(2x + 1) = 0$

$x = 0$	$2x + 1 = 0$
	$-1 \quad -1$
	$\frac{2x}{2} = \frac{-1}{2}$
	$x = -\frac{1}{2}$

$x = y - 3$
$0 = y - 3$
$+3 \quad +3$
$3 = y$
(0, 3)

$x = -\frac{1}{2}$
$x = y - 3$
$-\frac{1}{2} = y - 3$
$+3 \quad +3$
$y = \frac{5}{2}$
$(-\frac{1}{2}, \frac{5}{2})$

4) Solve the following system of equations algebraically and check: ✱ make sure to check on the test!

Checks on the last page

$y = x^2 + 3x + 4$
$y - x = 7$
$+x \quad +x$
$y = x + 7$

$x^2 + 3x + 4 = x + 7$
$-x - 7 \quad -x - 7$
$x^2 + 2x - 3 = 0$
$(x + 3)(x - 1) = 0$

$x + 3 = 0$	$x - 1 = 0$
$-3 \quad -3$	$+1 \quad +1$
$x = -3$	$x = 1$

$x = -3$ use original
$y - x = 7$
$y - (-3) = 7$
$y + 3 = 7$
$-3 \quad -3$
$y = 4$
(-3, 4)

$x = 1$
$y - x = 7$
$y - 1 = 7$
$+1 \quad +1$
$y = 8$
(1, 8)

5) What is a solution for the following system of equations?

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

A) (-2, 4)
B) (-6, 24)
C) (2, 4) ← Can find answer right away on the calc! Calc Y table
D) (6, 36)

$x^2 = -4x + 12$
$+4x - 12 \quad +4x - 12$
$x^2 + 4x - 12 = 0$
$(x + 6)(x - 2) = 0$

$x + 6 = 0$	$x - 2 = 0$
$-6 \quad -6$	$+2 \quad +2$
$x = -6$	$x = 2$

$x = -6$
$y = x^2$
$y = (-6)^2$
$y = 36$
(-6, 36)

$x = 2$
$y = x^2$
$y = (2)^2$
$y = 4$
(2, 4)

6) Solve the following system of equations for the positive value of x.

$y = x$
$y = x^2$

$x = x^2$
$-x \quad -x$
$x^2 - x = 0$
$x(x - 1) = 0$

$x = 0$	$x - 1 = 0$
	$+1 \quad +1$
	$x = 1$

$x = 1$

$x = 0$ not positive

7) The graphs of the equations $y = x^2 - 4x - 1$ and $y + 3 = -x$ are drawn on the same set of axes. At what point do the graphs intersect?

A) (-1, 4)
B) (2, -5)
C) (-1, -2)
D) (2, 1)

$y + 3 = -x$
$-3 \quad -3$
$y = -x - 3$

✱ put in to calc + go to table look for where y_1 & y_2 are the same!

8) The graphs of the equation $y = x^2$ and $y = 2x$ intersect in two points, one of which is the origin. What are the coordinates of the other point?

A) (1, 2)
B) (4, 2)
C) (2, 1)
D) (2, 4)

✱ on calc.

X	y_1	y_2
0	0	0
2	4	4

✱ look for where y_1 & y_2 are the same the

9) If the roots of a quadratic equation are 5 and 3, write the equation in $ax^2 + bx + c = 0$ form.

$x^2 - 8x + 15 = 0$
$x^2 - 3x - 5x + 15 = 0$
$(x - 5)(x - 3) = 0$

$x = 5$	$x = 3$

work Backwards

10) Which quadratic equation has -2 and 3 as its roots?

A) $x^2 + x - 6 = 0$
B) $x^2 - x - 6 = 0$
C) $x^2 + 5x + 6 = 0$
D) $x^2 - 5x + 6 = 0$

$x^2 - 1x - 6 = 0$
$x^2 - 3x + 2x - 6 = 0$
$(x+2)\,|\,(x-3) = 0$
$x = -2 \;|\; x = 3$

11) If the root of a quadratic equation is 4, write the equation in $ax^2 + bx + c = 0$ form.

(4,0)
$x^2 - 8x + 16 = 0$
$x^2 - 4x - 4x + 16 = 0$
$(x-4)(x-4) = 0$
$x = 4 \;|\; x = 4$

Root(4,0) =

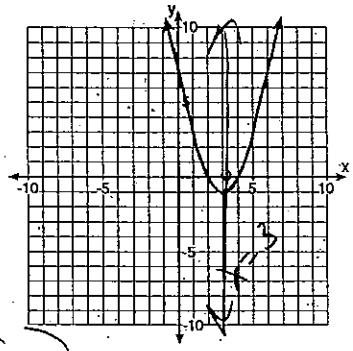
12) An equation whose roots are 4 and -1 is

A) $x^2 + 3x + 4 = 0$
B) $x^2 - 3x + 4 = 0$
C) $x^2 + 3x - 4 = 0$
D) $x^2 - 3x - 4 = 0$

where $y = 0$
* work backwards

$x^2 - 3x - 4 = 0$
$x^2 + x - 4x - 4 = 0$
$(x-4)\,|\,(x+1) = 0$
$x = 4 \;|\; x = -1$

13) Which is an equation of the line of symmetry for the parabola in the accompanying diagram?



A) $x = 3$
B) $x = 2$
C) $x = 4$
D) $y = 3$

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

A) $x = -4$
B) $x = 2$
C) $x = 4$
D) $x = -2$

$a: 2 \quad b: 8$

$x = \frac{-b}{2a}$

$x = \frac{-(8)}{2(2)} \quad x = \frac{-8}{4} \quad x = -2$

15) Find the equation of the axis of symmetry and the coordinates of the turning point for $y = -2x^2 - 4x + 6$.

$a: -2 \quad b: -4$

$x = \frac{-b}{2a}$

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

$x = \frac{4}{-4}$

$x = -1$ ← axis of symmetry

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

$(-1, 8)$ ← Turning point (vertex)

Can check on calc

16) The coordinates of the turning point of the graph of $y = 2x^2 - 4x + 1$ are

A) (1,1) $a: 2$
B) (-1,5) $b: -4$
C) (1,-1)
D) (2,1)

$x = \frac{-b}{2a}$

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

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

17) The coordinates of the turning point of the graph of the equation $y = x^2 - 2x - 8$ are $(1,k)$. What is the value of k? * check on calc

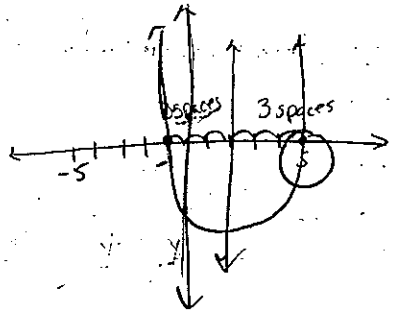
$x = 1$
$y = x^2 - 2x - 8$
$k = (1)^2 - 2(1) - 8$
$k = 1 - 2 - 8$
$k = -9$

$k = -9$

$(1, -9)$

(1,k) ← y

18) The equation of the axis of symmetry of a parabola is $x = 2$. If the parabola intersects the x-axis at the points whose coordinates are (-1,0) and $(k,0)$, find k.



work backwards to prove $x = 2$

$y = x^2 - 4x - 5$
$0 = x^2 - 4x - 5$
$x^2 - 4x - 5 = 0$
$(x-5)(x+1) = 0$
$x = 5 \;|\; x = -1$

$a: 1 \quad b: -4$

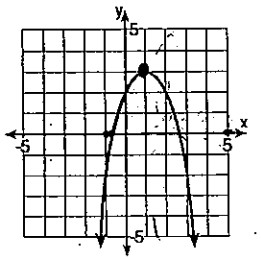
$x = \frac{-b}{2a}$

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

$x = \frac{4}{2}$

$x = 2$ ✓ correct

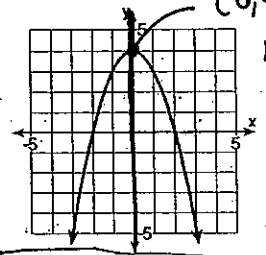
19)



Which of the following statements *best* describes given the graph?

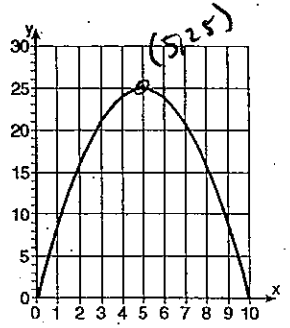
A) The maximum occurs when $y = 3$.
B) The axis of symmetry is $x = 3$.
C) An x-intercept is 3.
D) The axis of symmetry is $y = 1$.

20) Which of the following conclusions is accurate about the parabola below?



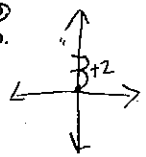
A) The axis of symmetry is the y-axis.
B) The minimum value is at (0,4). → maximum
C) The maximum value is at (2,0). minimum
D) The vertex is at (4,0).

21) Which of the following statements is a valid conclusion concerning the graph of the parabola below?



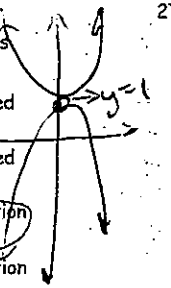
A) The minimum value is at (0,0).
B) The axis of symmetry is $x = 25$.
C) The vertex of the parabola is at (10,0).
D) The maximum value is located at (5,25).

22) When the y-intercept of a quadratic equation is increased by two, what will happen to the graph of the equation?
A) It is shifted down 2 units.
B) It is shifted 2 units to the right.
C) It is shifted 2 units up.
D) It is shifted 4 units up.



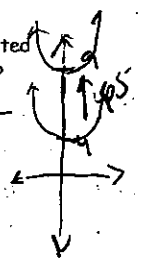
23) Describe the shift in the vertex of the parabola in the graph of the function $y = x^2$ if it is changed to $y = x^2 - 3$.
A) The vertex shifts 3 units down.
B) The vertex shifts 3 units up.
C) The vertex shifts 3 units to the right.
D) The vertex shifts 3 units to the left.

24) What is the effect on the graph of the equation $y = -2x^2 + 1$ when the equation is changed to $y = 2x^2 + 1$?
A) The graph of $y = -2x^2 + 1$ is translated 4 units up.
B) The graph of $y = -2x^2 + 1$ is translated 4 units down.
C) The graph of $y = -2x^2 + 1$ is a reflection of $y = 2x^2 + 1$ over the line $y = 1$.
D) The graph of $y = -2x^2 + 1$ is a reflection of $y = 2x^2 + 1$ across the y-axis.



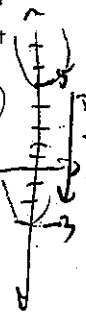
25) Which of the following functions will generate a graph that has been translated 5 units up from the graph of $y = x^2 + 4$?
A) $y = x^2 - 1$
B) $y = x^2 + 9$
C) $y = (x - 5)^2 + 4$
D) $y = x^2 + 5$

$y = x^2 + 9$



wider
$5 \to -3$ = lost of 8

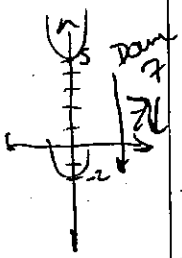
26) Eduardo graphs the functions $f(x) = x^2 + 5$ and $f(x) = \frac{1}{2}x^2 - 3$ on the same axes. Which of the following conclusions can be drawn about Eduardo's graphs of these equations?
A) The second graph is wider than the first graph and is translated down 8 units.
B) The second graph is narrower than the first graph and is translated down 3 units.
C) The second graph is narrower than the first graph and is translated down 8 units.
D) The second graph is wider than the first graph and is translated down 3 units.



27) Write the equation of a parabola whose graph is shifted 7 units down from the graph of $y = 3x^2 + 5$.

-7

$y = 3x^2 - 2$



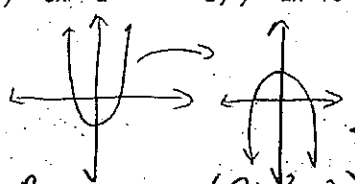
28) Which of the following equations will produce the narrowest parabola?
A) $y = -0.3x^2$
B) $y = \frac{3}{4}x^2$
C) $y = 0.6x^2$
D) $y = -\frac{1}{4}x^2$

largest #
largest coefficient

29) What effect will changing $y = 2x^2 + 4$ to $y = 4x^2 + 4$ have on the graph of the original equation?
A) The parabola will shift 2 units up.
B) The parabola will be narrower.
C) The y-intercept is doubled.
D) The parabola will be wider.

$2 \cdot 2 = 4$
↑ multiply by a # bigger than 1

30) The graph of the parabola $y = 2x^2 - 3$ is reflected in the x-axis. Which of the following equations *best* represents this transformation?
A) $y = -2x^2 + 3$
B) $y = -3x^2 + 2$
C) $y = 2x^2 + 3$
D) $y = -2x^2 - 3$



or $y = -(2x^2 - 3)$
$y = -2x^2 + 3$

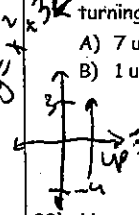
*reflect entire expression over x-axis

31) In order to slide the graph of $y = x^2 + 8$ down 5 units, which of the following changes should be made?
A) Change the 8 to 13.
B) Replace y with $(y - 5)$.
C) Change the 8 to 3.
D) Replace x with $(x - 5)$.

$y = x^2 + 8$
-5
$y = x^2 + 3$

32) In the function $y = x^2 - 4$, the -4 is changed to a 3. What *best* describes the change in the turning point?
A) 7 units down
B) 1 unit up
C) 1 unit down
D) 7 units up

$y = x^2 - 4$
$+7$
$y = x^2 + 3$



$-4 \to 3$
$+7$
-4
$+7$
3 ✓

33) How would the graph of the function $y = x^2 + c$ be affected if the value of the constant, c, were decreased by 5?
A) The graph would be shifted to the left by 5 units.
B) The graph would be shifted down 5 units.
C) The graph would be shifted up 5 units.
D) The graph would be shifted to the right by 5 units.

$y = x^2 - 5$

34) What will be the equation of the resulting graph if the graph of $y = |x|$ is shifted 3 units up?
A) $y = |x| - 3$
B) $y = |x - 3|$
C) $y = |x + 3|$
D) $y = |x| + 3$

35) What will be the equation of the resulting graph if the graph of $y = |x|$ is shifted 3 units to the left?

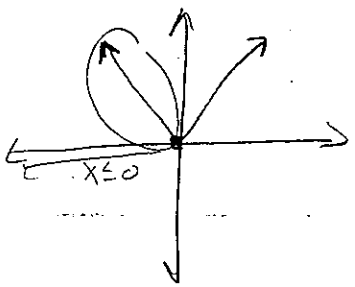
A) $y = |x - 3|$
B) $y = |x| + 3$
C) $y = |x| - 3$
D) $y = |x + 3|$

36) When compared to the graph of $y = |x|$, the graph of $y = |x| - 8$ is

A) shifted to the left 8 units
B) shifted down 8 units
C) shifted up 8 units
D) shifted to the right 8 units

37) The graph of $y = |x|$ for $x \leq 0$ is a

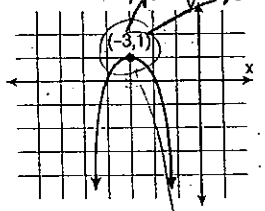
A) ray
B) line segment
C) line
D) parabola



38) Write the equation of the parabola that opens downwards, has a vertex V(1,5), and is congruent to $y = -\frac{1}{4}x^2$. [*Place the answer in the form* $y = a(x - h)^2 + k$.]

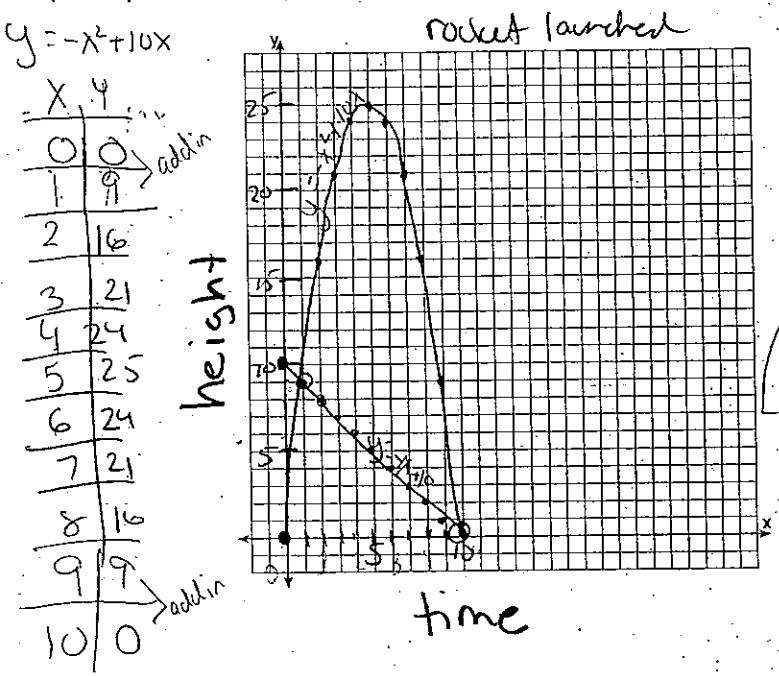
A) $y = -\frac{1}{4}(x + 1)^2 - 5$
B) $y = -\frac{1}{4}(x - 1)^2 + 5$
C) $y = -\frac{1}{4}(x - 1)^2 - 5$
D) $y = -\frac{1}{4}(x + 1)^2 + 5$

39) Which equation represents the parabola shown in the graph below?



A) $f(x) = -(x - 3)^2 - 3$
B) $f(x) = -(x - 3)^2 + 1$
C) $f(x) = -(x + 3)^2 + 1$
D) $f(x) = (x + 1)^2 - 3$

40) A rocket is launched from the ground and follows a parabolic path represented by the equation $y = -x^2 + 10x$. At the same time, a flare is launched from a height of 10 feet and follows a straight path represented by the equation $y = -x + 10$. Using the accompanying set of axes, graph the equations that represent the paths of the rocket and the flare, and find the coordinates of the point or points where the paths intersect. [*Show all work.*]

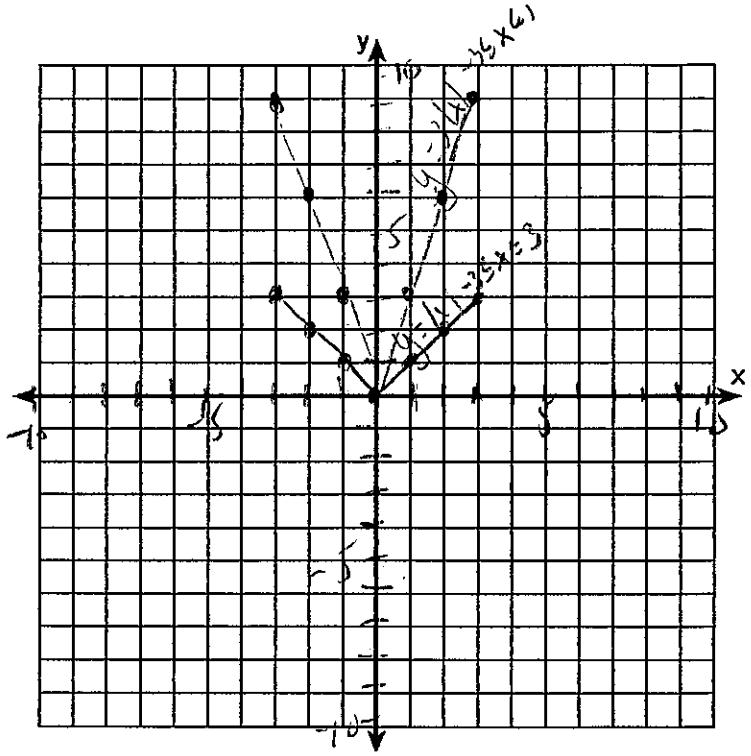


41) Without using a calculator, determine the vertex of the following parabola. Show all work!

$y = x^2 - 10x + 27$

42) (a) On the set of axes below, graph and label the equations $y = |x|$ and $y = 3|x|$ for the interval $-3 \le x \le 3$.

(b) Explain how changing the coefficient of the absolute value from 1 to 3 affects the graph.



a)

$y = |x|$

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

$y = 3|x|$

x	y
-3	9
-2	6
-1	3
0	0
1	3
2	6
3	9

b) The graph got narrower or stretched vertically or horizontally compressed

#3) Checks

$(0,3)$

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

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

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

$3 = 0 + 0 + 3$

$3 = 3$ ✓

$(0,3)$

$x = y - 3$

$3 = 0 - 3$

$3 = 3$ ✓

$\left(-\frac{1}{2}, \frac{5}{2}\right)$

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

$\frac{5}{2} = 2\left(-\frac{1}{2}\right)^2 + 2\left(-\frac{1}{2}\right) + 3$

$\frac{5}{2} = 2\left(\frac{1}{4}\right) + 2\left(-\frac{1}{2}\right) + 3$

$\frac{5}{2} = \frac{1}{2} - 1 + 3$

$\frac{5}{2} = \frac{5}{2}$ ✓

$\left(-\frac{1}{2}, \frac{5}{2}\right)$

$x = y - 3$

$-\frac{1}{2} = \frac{5}{2} - 3$

$-\frac{1}{2} = -\frac{1}{2}$ ✓

#4) $(-3,4)$

$y = x^2 + 3x + 4$

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

$4 = 9 + 3(-3) + 4$

$4 = 9 - 9 + 4$

$4 = 4$ ✓

$(-3,4)$

$y - x = 7$

$4 - (-3) = 7$

$4 + 3 = 7$

$7 = 7$ ✓

$(1,8)$

$y = x^2 + 3x + 4$

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

$8 = 1 + 3(1) + 4$

$8 = 1 + 3 + 4$

$8 = 8$ ✓

$(1,8)$

$y - x = 7$

$8 - 1 = 7$

$7 = 7$ ✓