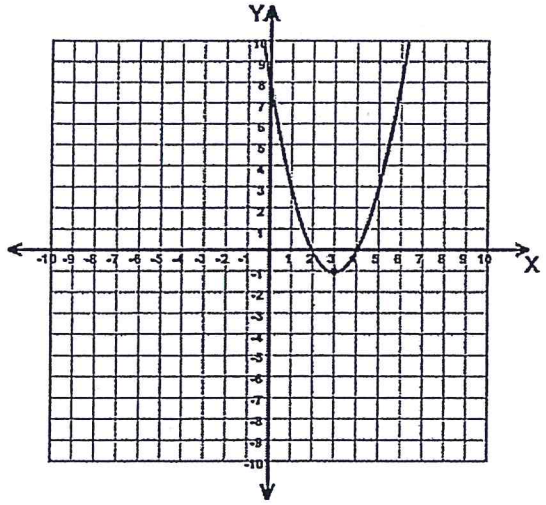
Name Key

Hour_____

Final Exam Review

Quadratic Functions

1.



X- Intercept: (2,0) (4,0)

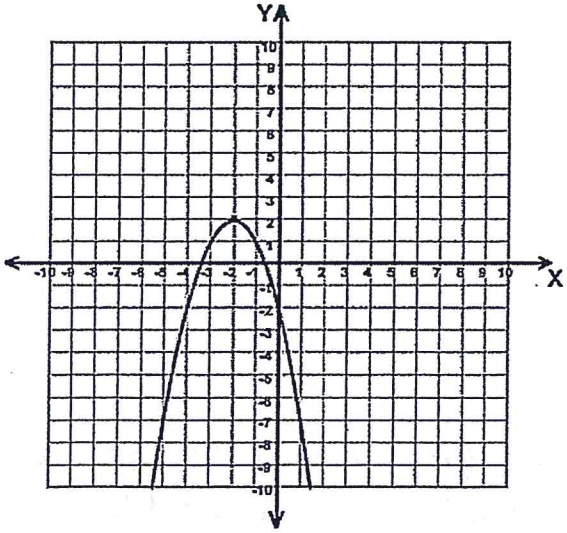
Y- Intercept: (0,8)

Vertex: (3,-1)

Axis of Symmetry $x = 3$

Max or Min? min

2.



X- Intercept: (-5,0) (-3.5,0)

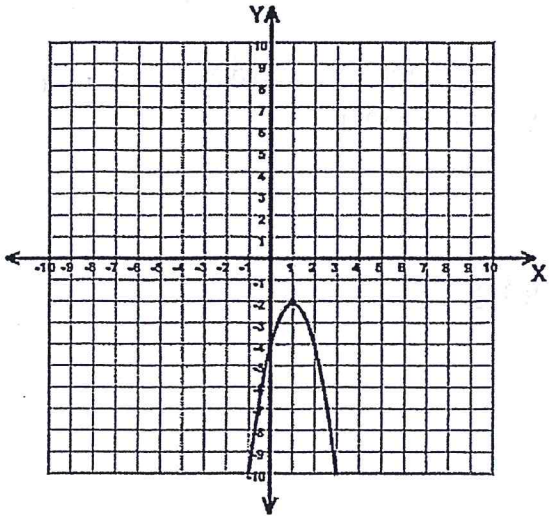
Y- Intercept: (0,-2)

Vertex: (-2,2)

Axis of Symmetry $x = -2$

Max or Min? max

3.



Zeros: None

Y- Intercept: (0,-4)

Vertex: (1,-2)

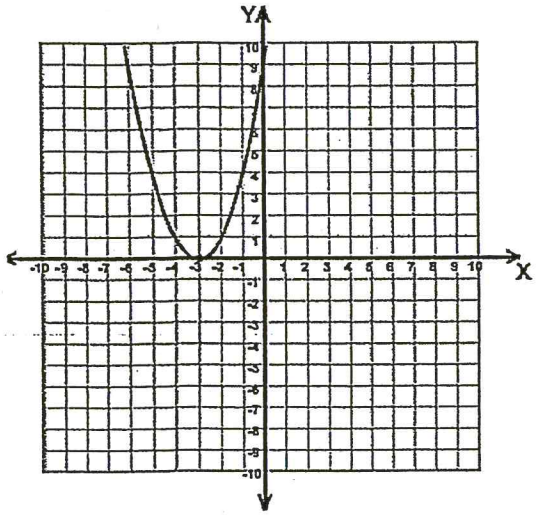
Axis of Symmetry $x = 1$

Max or Min?

max

2

4.



Roots: (-3,0)

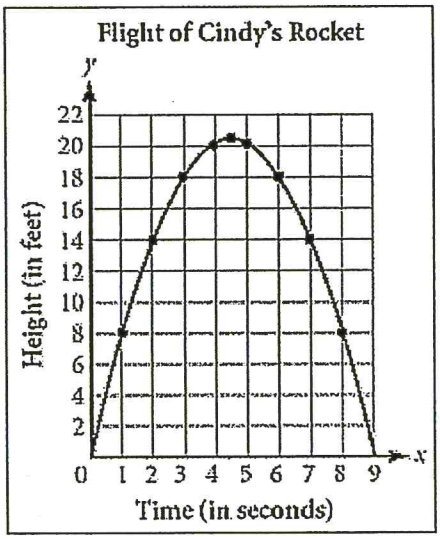
Y- Intercept: (0,9)

Vertex: (-3,0)

Axis of Symmetry x = -3

Max or Min? MIN

The following is a graph of the path of a rocket after it is launched.



5. Identify and explain the real world meaning of the following points. Height is in feet and time is in seconds.

a) Vertex (4.5, 20.5) The max height of the rocket is 20.5 feet. It reached the max height after 4.5 seconds

b) x-intercept(s) (0,0) (9,0) ← The rocket lands after 9 seconds

The rocket takes off →

c) y-intercept(s) (0,0)

6. How long does it take for the rocket to reach the **ground**?

9 seconds

7. What will the height be in 6 seconds?

18 feet

Solve each equation

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Find the zeros by factoring $x^2 - 2x + 8 = 0$ Not possible to factor. Use a different method $\frac{2 \pm \sqrt{(-2)^2 - 4(1)(8)}}{2(1)}$ $\frac{2 \pm \sqrt{-28}}{2}$	Find the roots by factoring $x^2 - 7x + 10 = 0$ $(x-5)(x-2)$ $x-5=0 \quad x-2=0$ $+5 \; +5 \quad +2 \; +2$ $x=5 \quad x=2$	Find the x-intercepts by factoring $x^2 + 16x + 64 = 0$ $(x+8)(x+8)$ $x+8=0 \quad x+8=0$ $-8 \; -8 \quad -8 \; -8$ $x=-8 \quad x=-8$
Find the x-intercepts by taking the square root $x^2 - 2 = -2$ $+2 \; +2$ $\sqrt{x^2} = \sqrt{0}$ $x=0$ One solution $(0,0)$	Find the zeros by taking the square root $\frac{4x^2}{4} = \frac{-32}{4}$ $\sqrt{x^2} = \sqrt{-8}$ $x = \sqrt{-8}$ NO real solution	Solve by taking the square root $3x^2 - 2 = 241$ $+2 \; +2$ $\frac{3x^2}{3} = \frac{243}{3}$ $\sqrt{x^2} = \sqrt{81}$ $x = \pm 9$ Two solutions $(9,0) \; (-9,0)$
Find the x-intercepts by graphing $5x^2 + 10x + 20 = 0$ Menu → analyze → zero No solutions	Find the roots by graphing $2x^2 - x - 21 = 0$ $(-3,0) \; (3.5,0)$	Solve by graphing $3x^2 + 8x - 64 = 0$ $(-6.14,0)$ $(-3.47,0)$

4

Solve by the quadratic formula

$2x^2 + 10x - 48 = 0$

$\frac{-10 \pm \sqrt{10^2 - 4(2)(-48)}}{2(2)}$

$\frac{-10 \pm \sqrt{484}}{4}$

$\frac{-10 \pm 22}{4}$

$\frac{(-10+22)}{4} = \boxed{3}$

$\frac{(-10-22)}{4} = \boxed{-8}$

$(3,0)$ $(-8,0)$

Find the zeros using the quadratic formula

$3x^2 - 4x - 132 = 0$

$\frac{4 \pm \sqrt{(-4)^2 - 4(3)(-132)}}{2(3)}$

$\frac{4 \pm \sqrt{1600}}{6}$

$\frac{4 \pm 40}{6}$

$\frac{(4+40)}{6} = \boxed{\frac{22}{3}}$

$\frac{4-40}{6} = \boxed{-6}$

$(\frac{22}{3}, 0)$ $(-6,0)$

Find the roots using the quadratic formula

$6x^2 + 4x - 112 = 0$

$\frac{-4 \pm \sqrt{4^2 - 4(6)(-112)}}{2(6)}$

$\frac{-4 \pm \sqrt{2704}}{12}$

$\frac{-4 \pm 52}{12}$

$\frac{(-4+52)}{12} = \boxed{4}$

$\frac{(-4-52)}{12} = \boxed{\frac{-14}{3}}$

$(4,0)$ $(\frac{-14}{3}, 0)$

Find the roots

$x^2 - 11x + 10 = 0$

$(x-10)(x-1)$

$x-10=0$ $\quad x-1=0$

$+10 \ +10 \quad +1 \ +1$

$x=10 \quad x=1$

$\boxed{(10,0)}$ $\boxed{(1,0)}$

Find the zeros of

$x^2 + 6x - 27 = 0$

$(x+9)(x-3)$

$x+9=0 \quad x-3=0$

$-9 \ -9 \quad +3 \ +3$

$x=-9 \quad x=3$

$(-9,0)$ $(3,0)$

Solve the equation

$2x^2 + 15x + 28 = 0$

use calculator

$(-4,0)$ $(-3.5,0)$

Find all the zeros

$2x^2 - 7x - 13 = 0$

$(-1.34,0)$

$(4.84,0)$

Find the roots

$6x^2 + 11x - 112 = 0$

$(-5.33,0)$

$(3.5,0)$

Find the x-intercepts

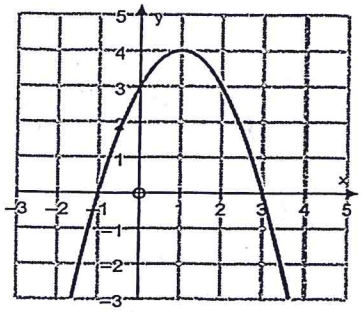
$3x^2 - 5x - 2 = 0$

$(-.33,0)$

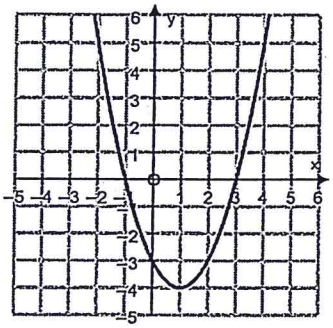
$(2,0)$

8. Select the correct graph for the equation $y = -(x - 1)(x - 7)$ (neg)

a.



b. X

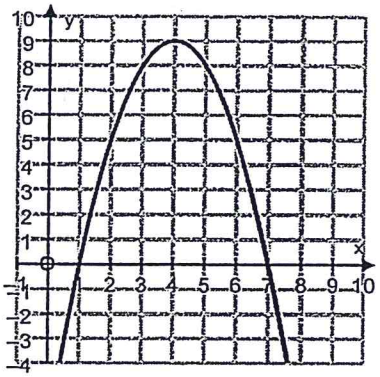


$x - 1 = 0$

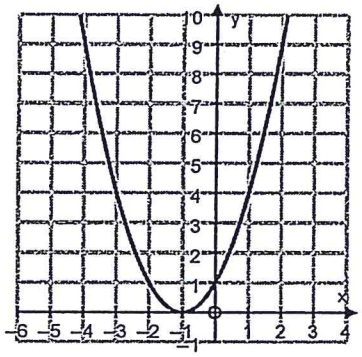
$x = 1$

$(1, 0)$

c.



d. X



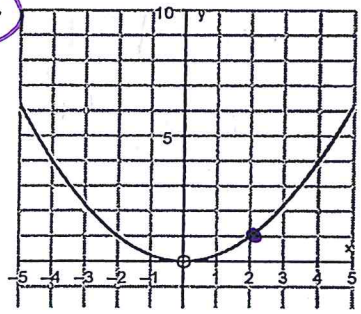
$x - 7 = 0$

$x = 7$

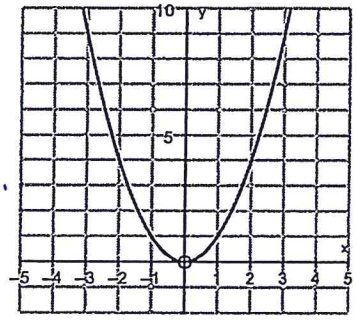
$(7, 0)$

9. Select the correct graph for the equation $y = 1/4\ x^2$

a.



b.

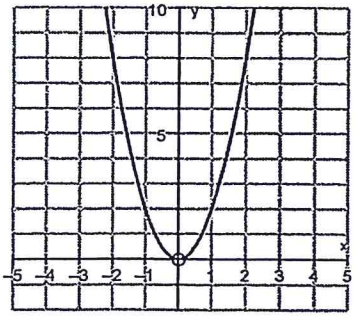


Plug in test points

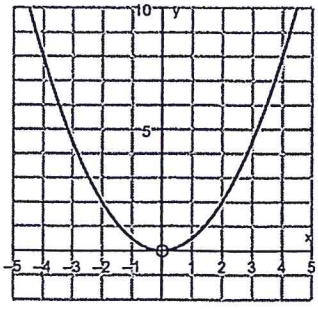
$\frac{1}{4}(2)^2 = 1$

$(2, 1)$

c.



d.



b

10. Select the correct graph for the equation $y=x^2 - 4x + 4$

find vertex

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

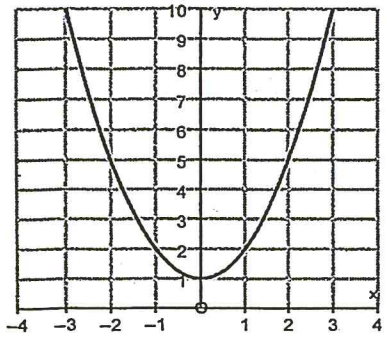
$\frac{4}{2} = 2$

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

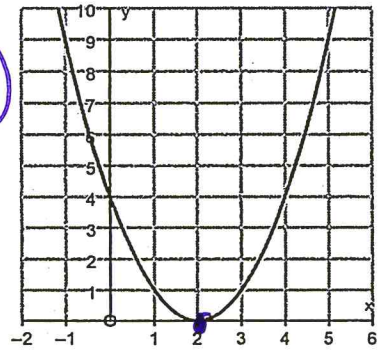
$y = 0$

$(2, 0)$

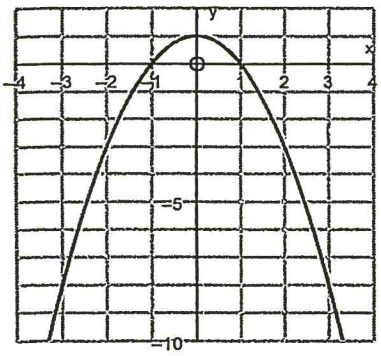
a.



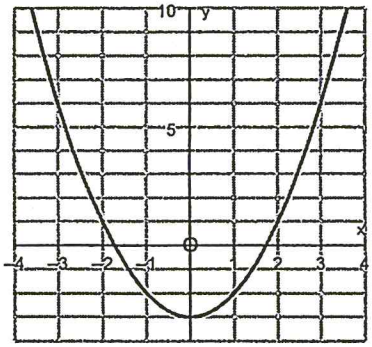
b.



c.



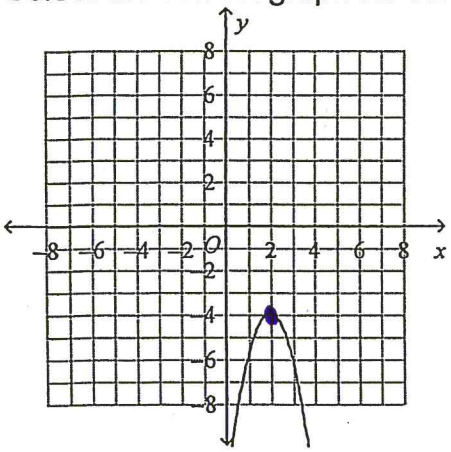
d.



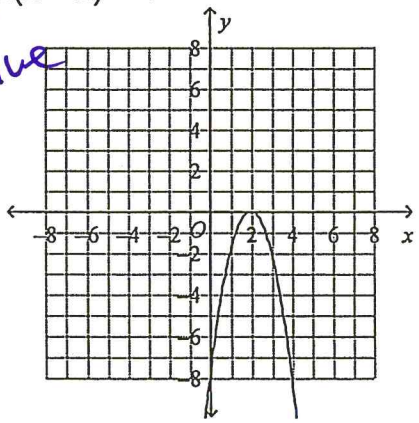
11. Select the correct graph for the equation $y=-2(x - 2)^2 - 4$

negative

a.

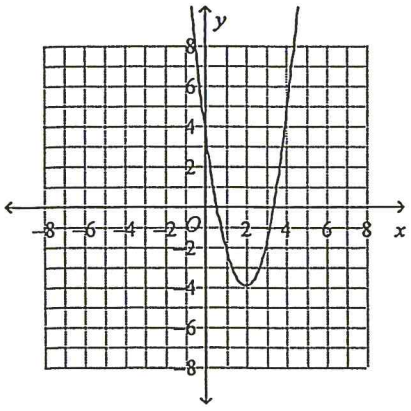


b.

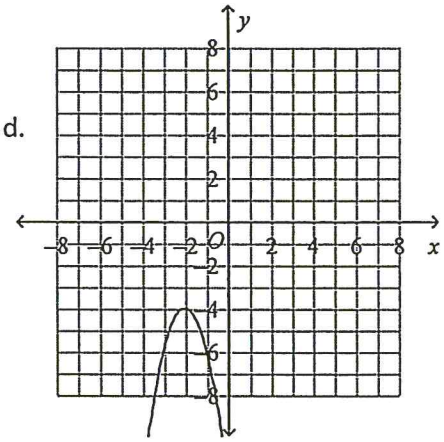


vertex $(2, -4)$

c.



d.



12. P=2L+2w Solve for W

$\frac{P-2L}{2} = \frac{2W}{2}$

$W = \frac{P-2L}{2}$

13. P=2L+2W Solve for L

$\frac{P-2W}{2} = \frac{2L}{2}$

$L = \frac{P-2W}{2}$

14. H=4m+2 Solve for m

$\frac{H-2}{4} = \frac{4m}{4}$

$m = \frac{H-2}{4}$

15. $A = \frac{1}{2}bh$ Solve for b

$\frac{2A}{h} = \frac{bh}{h}$

$b = \frac{2A}{h}$

Determine the roots/zeros

16. $f(x) = (x+7)(x-3)$

$x+7=0$ $\quad x-3=0$

$x=-7$ $\quad x=3$

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

$(x+3)(x+3)$

$x+3=0$

$x=-3$

Identify the vertex of each and describe if it is a maximum or minimum

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

max (-3, 4)

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

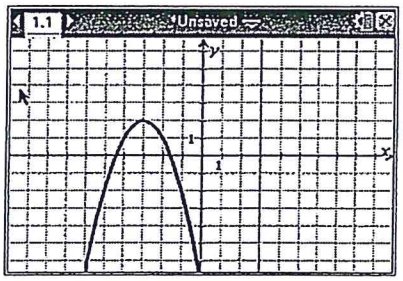
max

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

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

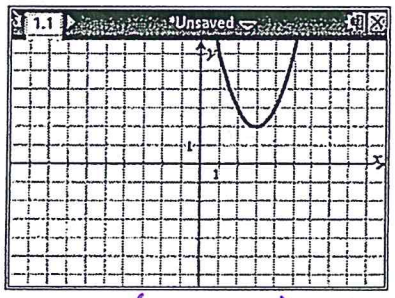
(1, 2)

20.



(-3, 2) max

21.



(3, 2) min

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

(3, 2)

max

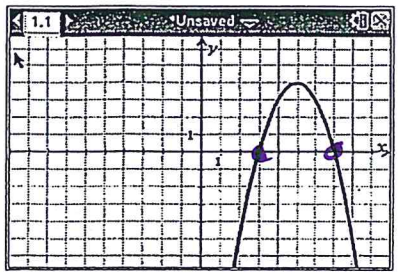
23. $f(x) = -(x-3)^2$

(3, 0)

max

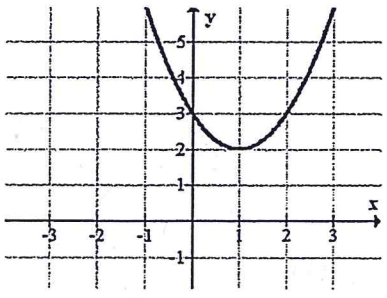
Determine the number of solutions

24.



2 solutions

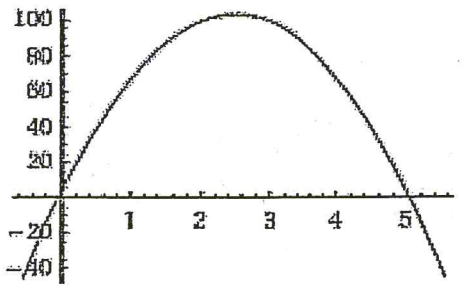
25.



NO solution

8

22. The height of a baseball, t seconds after being hit can be represente
3 and shown in the graph to the right. Use this information to determine the following:



a. Maximum height of the ball = 100 feet
b. Time the ball was in the air = 5 sec
c. The y-intercept = (0,0)

23. Identify the vertex and axis of symmetry from the following equation: $f(x) = -3(x-2)^2 - 4$

a. Axis of symmetry: $x = 2$

b. Vertex: $(2, -4)$

24. Identify the vertex and axis of symmetry from the following equation: $f(x) = (x+4)^2 + 4$

a. Axis of symmetry: $x = -4$

b. Vertex: $(-4, 4)$

25. Identify the vertex and axis of symmetry from the following equation: $f(x) = -(x-1)^2 + 4$

a. Axis of symmetry: $x = 1$

b. Vertex: $(1, 4)$

26. Identify the zeros and y-intercept of the following equation $f(x) = x(3x+4)$ $x = 0$ $3x+4=0$

a. Zeros: $(0,0)$ $\left(\frac{-4}{3}, 0\right)$
b. y-intercept: $(0,0)$

$-4 \quad -4$

$\frac{3x}{3} = \frac{-4}{3}$

$x = -\frac{4}{3}$

* plug in 0 for x

$f(x) = 0(3(0)+4)$

$f(x) = 0$

Use calculator 9

28. Identify the x-intercepts and y-intercept of the following equation $f(x) = 6x^2 + 4x - 8$

a. x-intercepts: menu -> analyze -> zero (-1.54, 0) (.87, 0)

b. y-intercept: menu -> Trace -> Graph trace -> 0
(0, -8)

29. Identify the zeros and y-intercept of the following equation: $f(x) = (x + 2)(x - 5)$

a. Zeros: (-2, 0) (5, 0)

b. y-intercept: (0, 0)

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

$x - 5 = 0$
$+5 \quad +5$
$x = 5$

30. Given $y = (x + 2)(x - 5)$ identify the following * use calculator

a. Vertex (1.5, -12.25)

b. Axis of symmetry $x = 1.5$

c. x-intercepts (-2, 0) (5, 0)

d. y-intercept (0, -10)

e. Is the vertex a maximum or minimum?

min

31. Given $y = (x - 2)(x - 5)$ identify the following * use calculator

a. Vertex (3.5, -2.25)

b. Axis of symmetry $x = 3.5$

c. x-intercepts (2, 0) (5, 0)

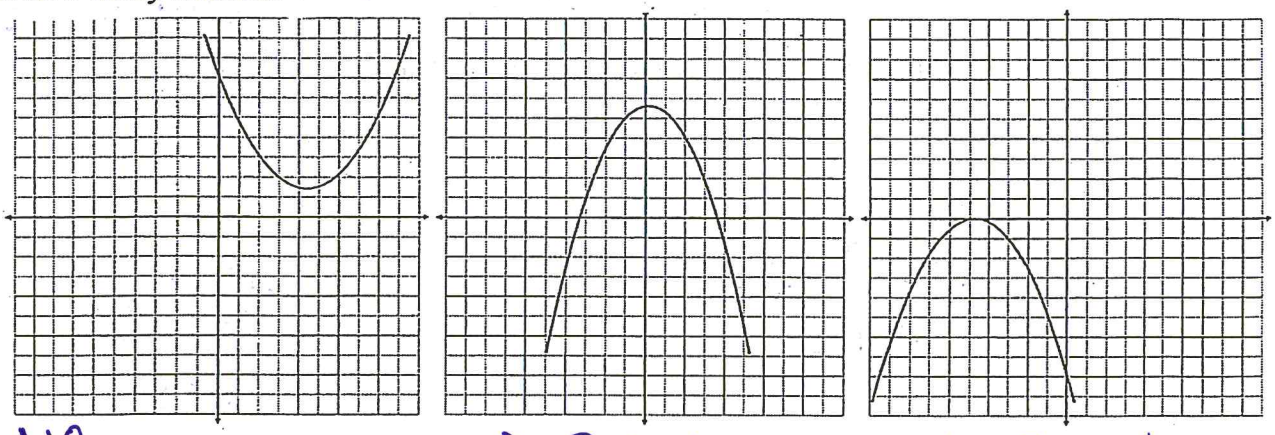
d. y-intercept (0, 10)

e. Is the vertex a maximum or minimum?

min

10

32. How many solutions does each of the following graphs have?



No solution 2 Solutions 1 Solutions

33. In the factored polynomial f(x) = (x+3)(x-2), what can be determined?

a. x intercepts at (3, 0) and (-2, 0)
b. x intercepts at (-3, 0) and (2, 0)
c. vertex at (3, -2)
d. vertex at (-3, 2)

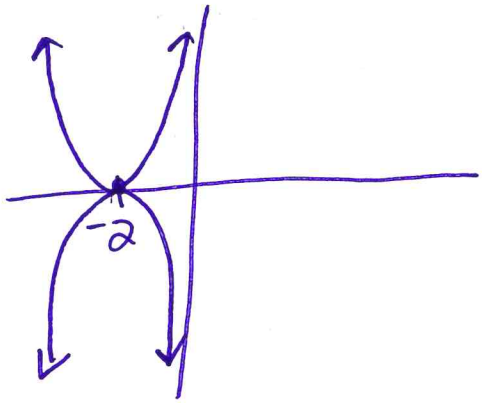
34. What is true of the graph of the function $f(x) = x^2 + 8x + 16$

$(x+4)(x+4)$

a. The graph passes through the x-axis at -4
b. The graph touches the x-axis at 4.
c. The graph touches the x-axis at -4
d. The graph passes through the x-axis at -4 and 4.

35. When solving a quadratic function, Clinton finds that the function has one root, -2. Circle all possible true statements based on this information.

a. His parabola opens down
b. The vertex is at (-2, 0)
c. The x-intercept must be at (-2,0)
d. The axis of symmetry is x= -2



36. Find the solutions: $y = (x - 4)(x + 3)$

a. $x = \{-4, 3\}$
b. $x = \{4, -3\}$
c. $x = \{4, 3\}$
d. $x = \{-4, -3\}$

$x - 4 = 0 \quad x + 3 = 0$
$+4 \quad +4 \quad -3 \quad -3$
$x = 4 \quad x = -3$

37. Find the x-intercepts $f(x) = (x - 3)(x - 5)$

a. $x = \{-3, 5\}$
b. $x = \{3, -5\}$
c. $x = \{3, 5\}$
d. $x = \{-3, -5\}$

38. Find the x-intercepts $y = (x - 5)(x + 1)$

a. (0, -5) (0,1)
b. (-5, 0) (1,0)
c. (5, 0) (-1, 0)
d. (0, 5) (0, -1)

39. Find the x-intercepts $y = x(x - 7)$

a. (7, 0)
b. (-7, 0)
c. (-7, 0) (0, 0)
d. (0, 0) (7, 0)

$x = 0 \quad x - 7 = 0$
$+7 \quad +7$
$x = 7$

40. Solve for m in the equation: $k = 2m + 2r$

$-2r \quad -2r$
$\frac{k - 2r}{2} = \frac{2m}{2}$

$m = \frac{k - 2r}{2}$

41. Solve for n in the equation: $y = 9n + 27$

$-27 \quad -27$
$\frac{y - 27}{9} = \frac{9n}{9}$

$n = \frac{y - 27}{9}$

42. Solve for r in the equation: $A = \pi r^2$

$\frac{}{\pi} \quad \frac{}{\pi}$
$\sqrt{\frac{A}{\pi}} = \sqrt{r^2}$

$r = \pm\sqrt{\frac{A}{\pi}}$