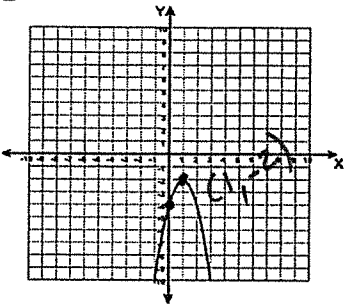
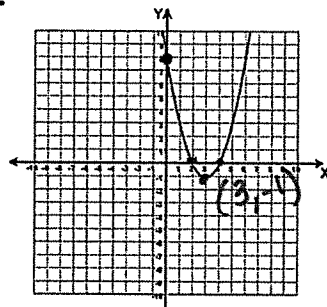
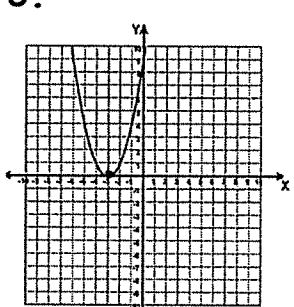
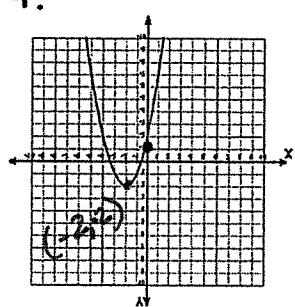


Algebra 1 Semester 2 Study Guide

II. Quadratic Functions

For 1 - 4,

- a) find the y-intercept(s)
- b) find the x-intercept(s)/zero(s)/root(s)/solution(s)
- c) identify the vertex
- d) is the vertex a maximum or a minimum
- e) Identify the axis of symmetry

<p>1-</p> 	<p>2.</p> 	<p>3.</p> 	<p>4.</p> 
<p>a-</p> <p>$y = -4$</p>	<p>$y = 8$</p>	<p>$y = 8$</p>	<p>$y = 1$</p>
<p>b-</p> <p>No solution</p>	<p>$(2, 0)$ $(4, 0)$</p>	<p>$(-3, 0)$</p>	<p>$(-0.5, 0)$ $(-3.5, 0)$</p>
<p>c-</p> <p>$(1, -2)$</p>	<p>$(3, -1)$</p>	<p>$(-3, 0)$</p>	<p>$(-2, -2)$</p>
<p>d-</p> <p>Max</p>	<p>Min</p>	<p>Min</p>	<p>Min</p>
<p>e-</p> <p>$x = 1$</p>	<p>$x = 3$</p>	<p>$x = -3$</p>	<p>$x = -2$</p>

Factor each expression for 5 - 8.

5. $6x^5 + 3x^4 - 9x^2$

$3x^2(2x^3 + x^2 - 3)$

GCF

6. $49r^2 - 144$

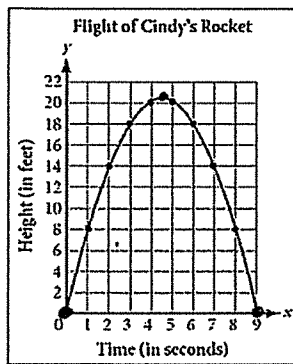
GCF $2(y^2 - y - 56)$
 SDB $2(y-8)(y+7)$

7. $2y^2 - 2y - 112$

8. $12d^2 - 8d + 1$

$d^2 - 8d + 12$
 $(d-6)(d-2)$
 $(\frac{d-6}{12})(\frac{d-2}{12}) = (\frac{d-6}{2})(\frac{d-2}{6})$
 $(2x-1)(6x-1)$

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



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

a) Vertex: $(4.5, 21)$ $t \rightarrow h$
 $h = \text{maximum height (ft)}$
 $t = \text{Time (sec)}$

b) x-intercept(s): $x = 0$ Starting time $x = 9$ Time rocket Hit the ground.

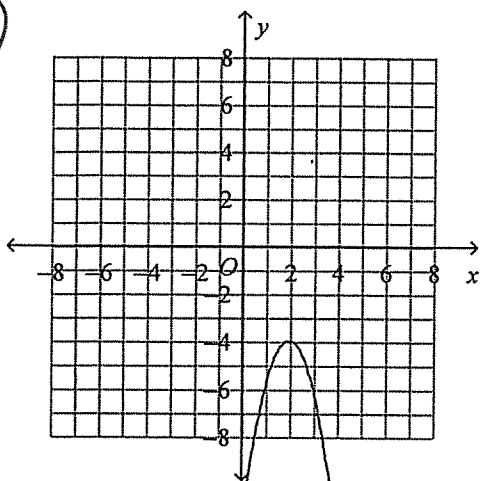
c) y-intercept(s) $y = 0 \rightarrow$ original height

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

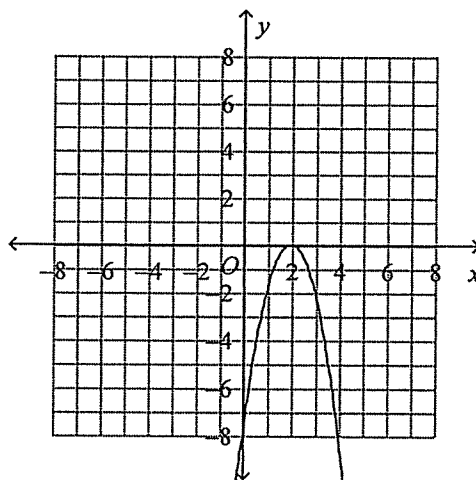
9 Sec.

11. Which is the graph of $y = -2(x - 2)^2 - 4$?

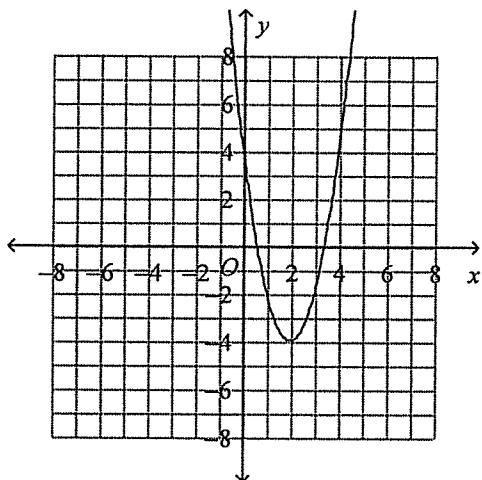
a.



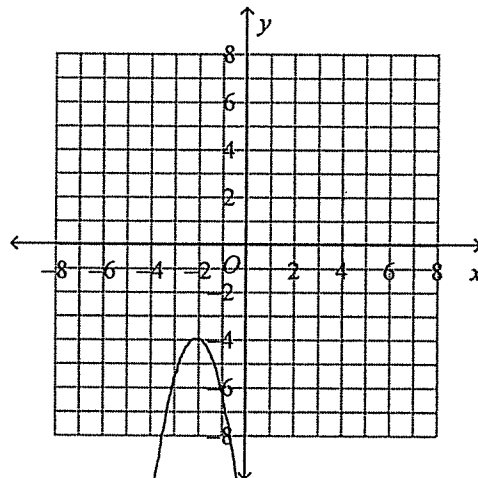
c.



b.



d.



12. Find the solutions/ x-intercepts for the factored form of the functions:

a. $y = (x - 5)(x + 2)$
 $(x - 5)(x + 2) = 0$ / $x = 5, x = -2$

b. $y = (x + 1)(x + 6)$
 $(x + 1)(x + 6) = 0$ / $x = -1, x = -6$

c. $y = -2(x + 5)^2$
 $(x + 5)^2 = 0$ / $x = -5$

13. Explain what can be determined by looking at each form of a quadratic function.

- a) Standard $y = ax^2 + bx + c$ y -int = c , Vertex = $-\frac{b}{2a}$, axis of symmetry, a max min
- b) Factored $y = (x-a)(x-b)$ Zeros
- c) Vertex $y = a(x-h)^2 + k$ Vertex (h, k) , a max min, $a < 0$ $a > 0$

14. Which statements accurately describes the graph of the following function $f(x) = x^2 - x - 12$

- a. This function has 2 solutions
- b. The graph passes through the x-axis at 4
- c. Possible solutions are $(4, 0)$ and $(3, 0)$
- d. Possible solutions are $(4, 0)$ and $(-3, 0)$

Factor the expressions

15. $-15x^2 - 21x$

a. $x(-15x - 21)$

c. $-3x(5x + 7)$

b. $-15x(x + 7)$

d. $5x(x - 3 + 7)$

16. $x^2 - 6x + 8$

a. $(x + 4)(x + 2)$

c. $(x - 4)(x + 2)$

b. $(x - 2)(x - 4)$

d. $(x - 2)(x + 4)$

17. Find the vertex of each. Does it represent maximum or minimum?

a) $f(x) = -5(x+3)^2 - 4$ $(-3, -4)$ Max

c) $f(x) = 3x^2 + 6x - 5$ $(-1, -8)$ Min

d) $f(x) = -(x-3)^2$ $(3, 0)$ Max

d) $f(x) = 2x^2 - 4x + 1$ $(1, -1)$ Min

e) $f(x) = (x-5)^2 + 3$ $(5, 3)$ Min

18. a) What is the vertex of $g(x) = (x-3)^2 + 2$? $(3, 2)$

Which of the following has the same vertex as $g(x)$? Defend each answer.

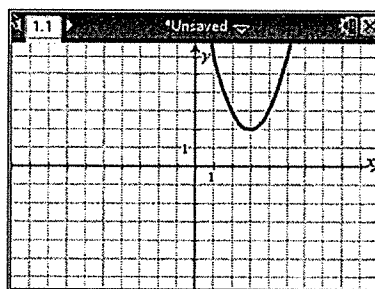
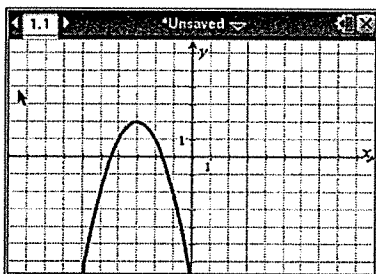
b) $h(x) = -2(x-3)^2 - 2$

c) $f(x) = (x+3)^2 + 2$

d) $p(x) = x^2 - 6x + 11$

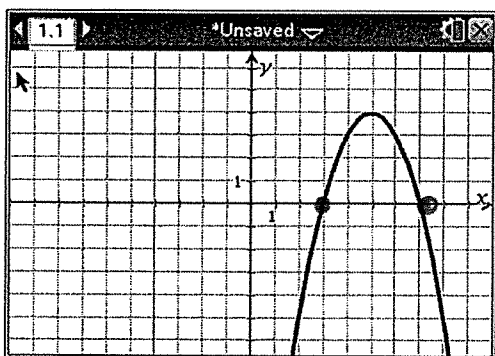
e)

f)



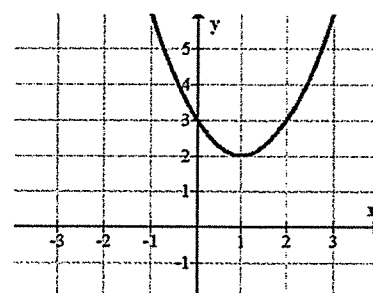
19. Determine the number of solutions for the following quadratic functions.

a.



Two solutions

b.



NO solutions

20. Find the zeros for the graph of the function $z^2 + 6z - 27 = 0$ $x = 3$ $x = -9$

21. Find the zeros for the graph of the function for the below equations and determine how many solutions each one has?

a. $10x^2 - 7x = 33$. $10x^2 - 7x - 33 = 0$ $(2.2, 0), (1.5, 0)$

b. $2x^2 + 15x + 28 = 0$ $(3.5, 0)$

c. $4x^2 - 15 = 9$ $\rightarrow X = \pm \sqrt{6}$

d. $6x^2 + 13x + 6 = 0$ $(-1.5, 0), (-0.667, 0)$

e. $c^2 - 3c = 0$ $\rightarrow C(C-3) = 0 // C = 0, C = 3$

22. Sam is throwing a ball to his friend but unfortunately his friend did not catch it so it hits the ground. The path the ball took represented by the equation: $B(t) = -8t^2 + 24t + 2$

a- What is the original height (y-intercept) $y = 2$

b- What is the maximum height that the ball reach? $v(t, h)$ $h = 20 \text{ ft}$

c- What will the height, in feet, of the ball be after 2 seconds? $h = 18 \text{ ft}$
 plug in 2 sec for t