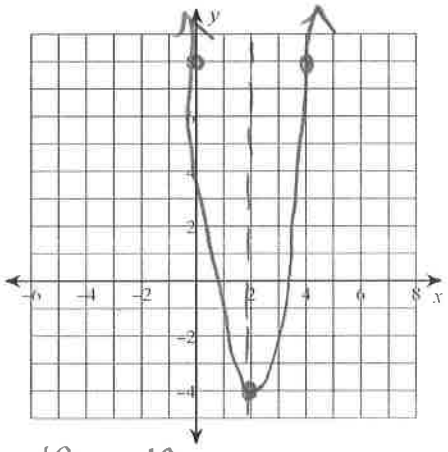
Algebra 1 Name Key

Unit 7 Test Review WS

Sketch the graph of each function.

1) $y = 3x^2 - 12x + 8$



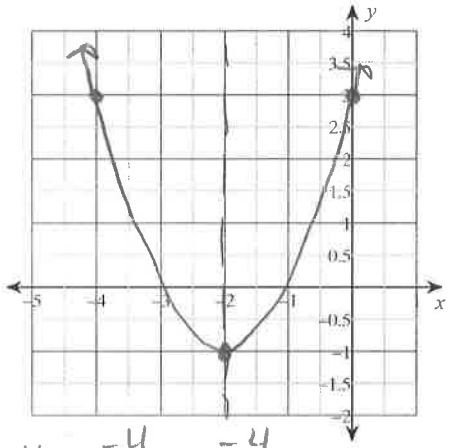
$x = \frac{12}{2(3)} = \frac{12}{6} = 2$

$3(2)^2 - 12(2) + 8 = -4$

vertex $(2, -4)$

y-int $(0, 8)$

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



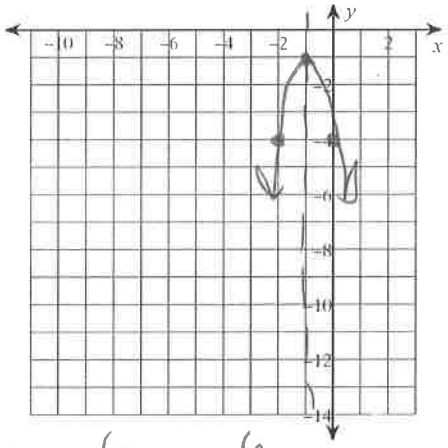
$x = \frac{-4}{2(1)} = \frac{-4}{2} = -2$

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

vertex $(-2, -1)$

y-int $(0, 3)$

3) $y = -3x^2 - 6x - 4$



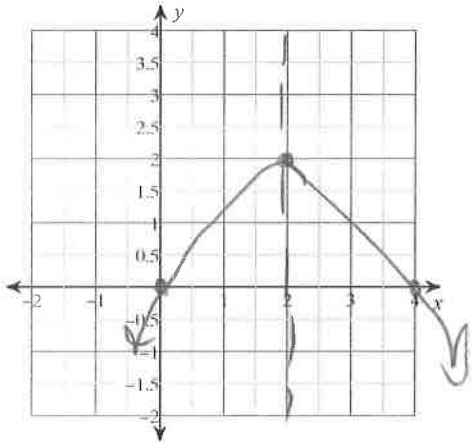
$x = \frac{6}{2(-3)} = \frac{6}{-6} = -1$

$-3(-1)^2 - 6(-1) - 4 = -1$

vertex $(-1, -1)$

y-int $(0, -4)$

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



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

$-\frac{1}{2}(2)^2 + 2(2) = 2$

vertex $(2, 2)$

y-int $(0, 0)$

5) Using the graph from question #2, answer the following:

a) What is the vertex? $(-2,-1)$

b) What is the axis of symmetry? $x=-2$

c) What is the y-intercept (as an ordered pair)? $(0,3)$

d) What is the domain? $x \in \mathbb{R}$

e) What is the range? $y \geq -1$

f) Does it have a maximum or a minimum? min What is the value? -1

g) What are the zeros of the function? $(-1,0)$ $(-3,0)$

6) Using the graph from question #4, answer the following:

a) What is the vertex? $(2,2)$

b) What is the axis of symmetry? $x=2$

c) What is the y-intercept (as an ordered pair)? $(0,0)$

d) What is the domain? $x \in \mathbb{R}$

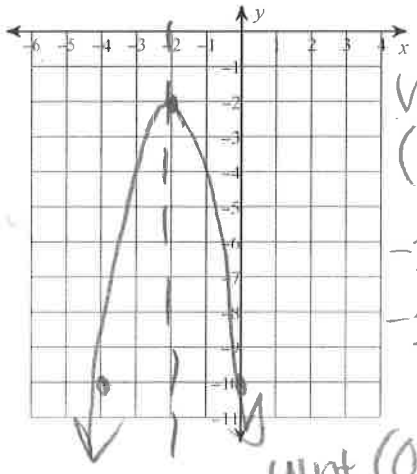
e) What is the range? $y \leq 2$

f) Does it have a maximum or a minimum? max What is the value? 2

g) What are the zeros of the function? $(0,0)$ $(4,0)$

Sketch the graph of each function.

7) $y = -2(x+2)^2 - 2$

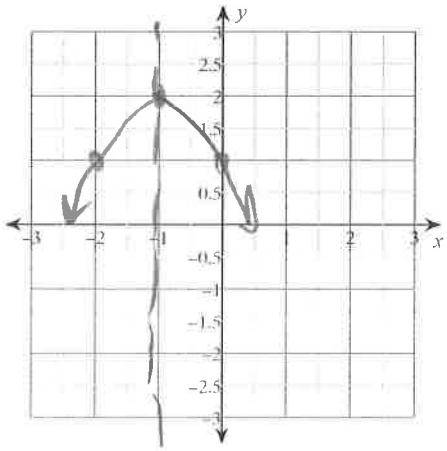


vertex
$(-2,-2)$

$-2(0+2)^2-2$
$-2(2)^2-2$
-10

yint $(0,-10)$

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

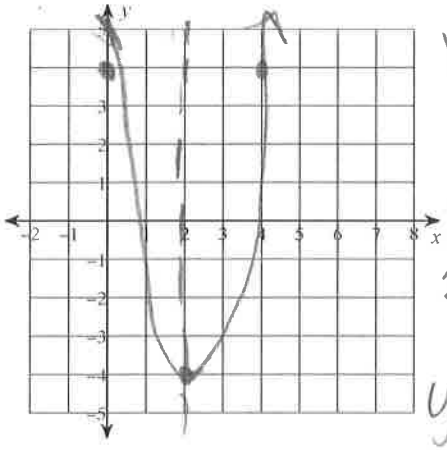


vertex
$(-1,2)$

$-(0+1)^2+2$
$-(1)^2+2$
$-1+2=1$

yint $(0,1)$

9) $y = 2(x-2)^2 - 4$



vertex
(2, -4)

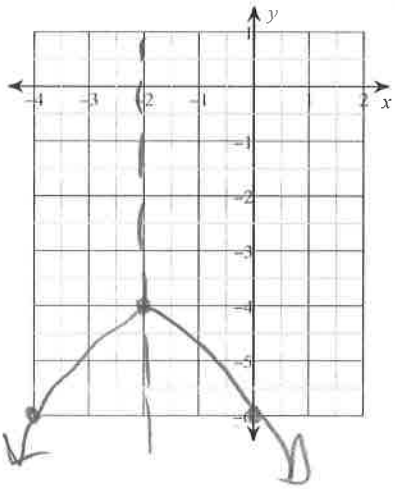
$2(0-2)^2-4$

$2(-2)^2-4$

4

y-int
(0, 4)

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



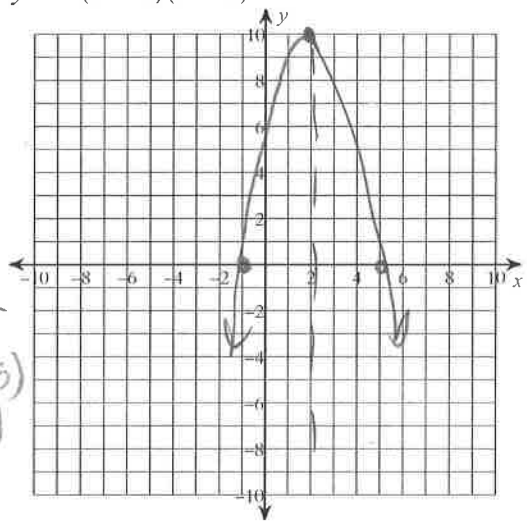
vertex
(-2, -4)

$-\frac{1}{2}(0+2)^2-4$

$-\frac{1}{2}(2)^2-4=-6$

y-int (0, -6)

11) $y = -(x+1)(x-5)$



X-int
(-1, 0)
(5, 0)

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

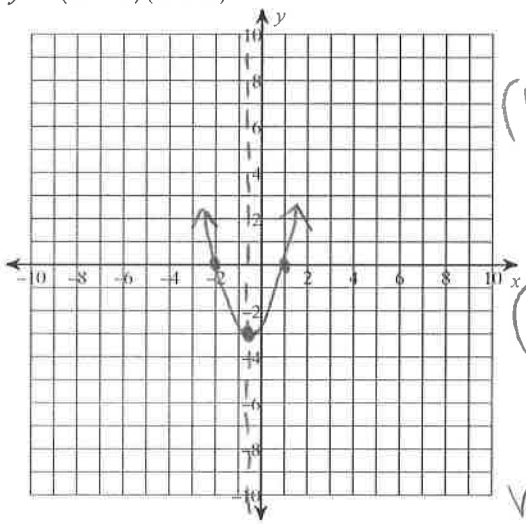
$-(2+1)(2-5)$

$-(3)(-3)$

10

(2, 10)
vertex

12) $y = (x-1)(x+2)$



X-int
(1, 0) (-2, 0)

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

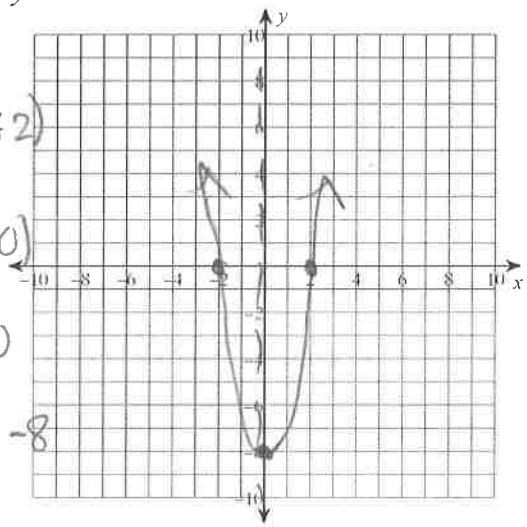
$(-\frac{1}{2}-1)(-\frac{1}{2}+2)$

$(-1\frac{1}{2})(1\frac{1}{2})$

-3

vertex
$(-\frac{1}{2}, -3)$

13) $y = 2x^2 - 8$



$2(x^2-4)$

$2(x-2)(x+2)$

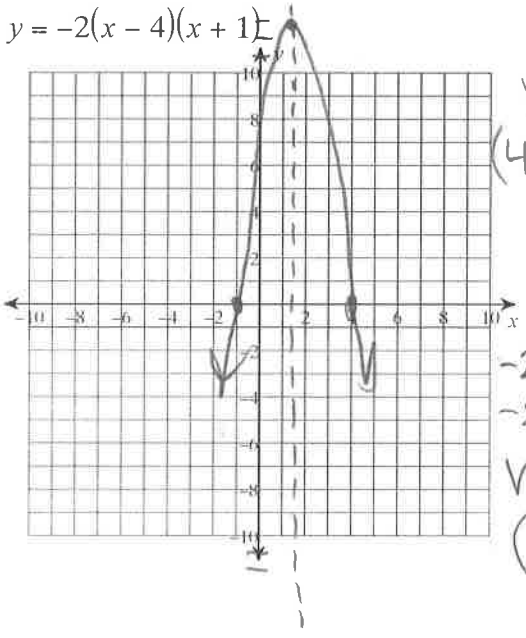
X-int
(2, 0) (-2, 0)

$\frac{2+-2}{2}=0$

$2(0)^2-8=-8$

vertex
(0, -8)

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



X-int
(4, 0) (-1, 0)

$\frac{4+-1}{2}=1.5$

$-2(1.5-4)(1.5+1)$

$-2(-2.5)(2.5)$

vertex
(1.5, 12.5)

15) Write a quadratic function in vertex form whose graph satisfies the given conditions:

a) vertex at $(-5, -1)$ and pass thru $(-2, 2)$

(h, k) (x, y)

$y = a(x-h)^2 + k$

$2 = a(-2+5)^2 - 1$

$2 = a(3)^2 - 1$

$2 = 9a - 1$

$+1 \quad +1$

$\frac{3}{9} = \frac{9a}{9} \quad a = \frac{1}{3}$

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

b) vertex at $(1, 8)$ and pass thru $(3, 12)$

$y = a(x-h)^2 + k$

$12 = a(3-1)^2 + 8$

$12 = a(2)^2 + 8$

$12 = 4a + 8$

$-8 \quad -8$

$\frac{4}{4} = \frac{4a}{4} \quad a = 1$

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

16) Write a quadratic function in standard form whose graph satisfies the given conditions:

a) vertex at $(4, 8)$

$y = a(x-h)^2 + k$

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

$= (x-4)(x-4) + 8$

$= x^2 - 4x - 4x + 16 + 8$

$y = x^2 - 8x + 24$

b) passes thru $(-4, 0)$, $(3, 0)$, and $(2, -18)$

$y = a(x+4)(x-3)$

$-18 = a(2+4)(2-3)$

$-18 = a(6)(-1)$

$\frac{-18}{-6} = \frac{-6a}{-6}$

$3 = a$

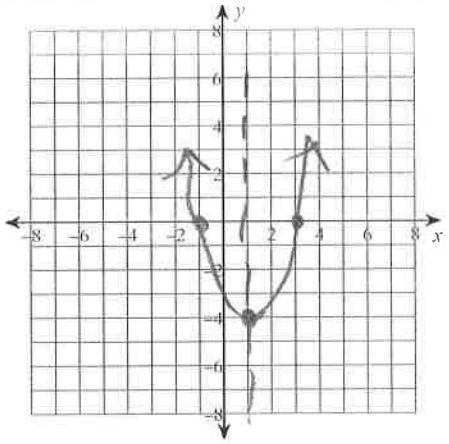
$y = 3(x+4)(x-3)$

$= 3(x^2 - 3x + 4x - 12)$

$= 3(x^2 + x - 12)$

$y = 3x^2 + 3x - 36$

17) Find the zeros of the function $f(x) = x^2 - 2x - 3$. Then graph.



$x^2 - 2x - 3$ (−3)

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

$x(x-3) + 1(x-3)$

$(x+1)(x-3)$

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

$(1)^2 - 2(1) - 3$

$1 - 2 - 3$

$-1 - 3$

-4

vertex $(1, -4)$

$x + 1 = 0$

$-1 \quad -1$

$x = -1$

$x - 3 = 0$

$+3 \quad +3$

$x = 3$

18) The function $h(x) = -16x^2 + 32x + 2$ represents the height in feet of a softball after x seconds. Find the maximum height of the softball.

$x = \frac{-32}{2(-16)} = \frac{-32}{-32} = 1$

$-16(1)^2 + 32(1) + 2 = 18$

18 ft

Describe the transformation of each quadratic function.

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

open up
stretch
right 5
up 4
(5, 4)

20) $y = -\frac{2}{3}(x + 1)^2 + 7$

open down
compress
left 1
up 7
(−1, 7)

21) $y = -\frac{5}{4}(x - 11)^2$

open down
stretch
right 11
(11, 0)

Write a quadratic function in vertex form to represent the transformation.

22) opens up, left 8 and down 17, stretched by a factor of 4

$y = 4(x + 8)^2 - 17$

23) vertex at $(-6, 10)$, opens up, compressed by a factor of your choice

$y = \frac{1}{2}(x + 6)^2 + 10$

24) up 9, right 12, opens down, compressed by $\frac{3}{7}$

$y = -\frac{3}{7}(x - 12)^2 + 9$