TEST REVIEW 4.1 – 4.3

Identify (a) the axis of symmetry and the (b) vertex. State whether the graph (c) opens up or down and give (d) the maximum or minimum value.

1. $f(x)=x^2-8x+17$

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

(b) $(4, 1)$ $(4)^2-8(4)+17$

(c) up

(d) $MIN = 1$

2. $f(x)=-x^2-9x-4$

(a) $x=\frac{9}{2(-1)}=-4.5$

(b) $(-4.5, \quad)$ $-(-4.5)^2-9(4.5)-4$

(c) down

(d) max =

3. $f(x)=-2x^2+8x+5$

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

(b) $(2, 13)$ $-2(2)^2+8(2)+5$

(c) down

(d) $MAX = 13$

4. $g(x)=3x^2+6x-8$

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

(b) $(-1, -11)$ $3(-1)^2+6(-1)-8$

(c) up

(d) min $= -11$

Draw & label all parts of the graph!

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

a. graph opens up/down down

b. axis of symmetry:

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

c. vertex:

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

$-4+8-3$

d. y-intercept:

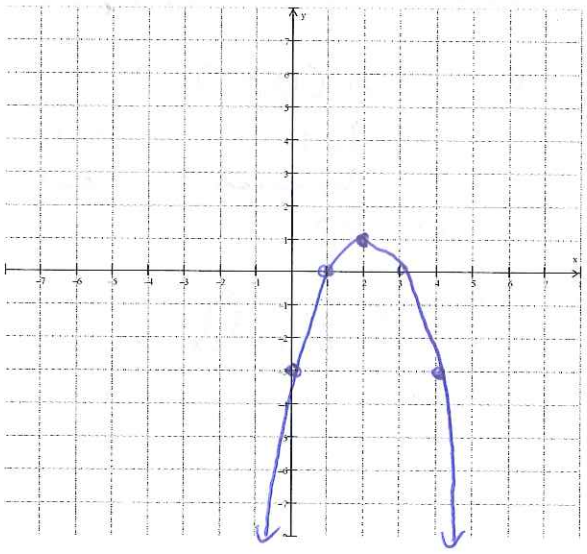
$(0,-3)$

e. zeros:

$x=1$ and $x=3$

f. domain: $\mathbb{R}$

range: $(-\infty, 1]$



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

a. graph opens up/down up

b. axis of symmetry:

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

c. vertex:

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

$1-2+1$

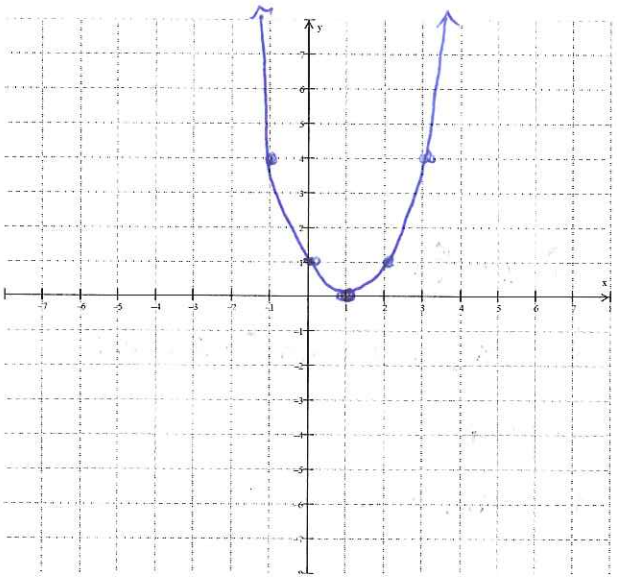
(1, 0)

d. y intercept: (0, 1)

d. zeros: $x=1$

e. domain: $\mathbb{R}$

range: $[0, \infty)$



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

a. graph opens up/down down

b. axis of symmetry:

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

c. vertex:

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

$-4+8-1$

(-2, 3)

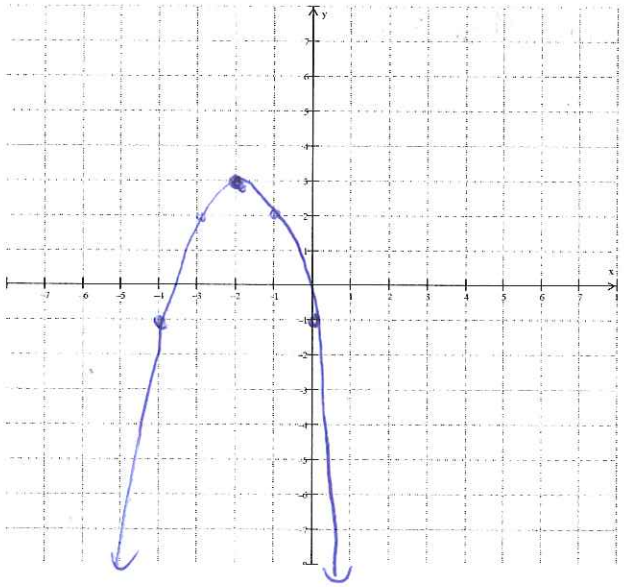
d. y intercept: (0, -1)

d. zeros: between -4 and -3

between -1 and 0

e. domain: $\mathbb{R}$

range: $(-\infty, 3]$



Solve the following quadratic equations and by factoring. You must show the factored form as well as the solutions (zeros).

60
1 60
2 30
3 20
4 15
5 12
6 10

11. $x^2 + 16x = -60$

$x^2 + 16x + 60 = 0$

$(x+6)(x+10) = 0$

$x+6=0 \quad x+10=0$

$x=-6 \quad x=-10$

-10
1 -10
2 -5

12. $2x^2 - 3x - 5 = 0$

$(2x^2+2x)(-5x-5)=0$

$2x(x+1)-5(x+1)=0$

$(x+1)=0 \quad 2x-5=0$

$x=-1 \quad x=5/2$

10
-1 -10
-2 -5

13. $x^2 - 7x + 10 = 0$

$(x-2)(x-5)=0$

$x-2=0 \quad x-5=0$

$x=2 \quad x=5$

14. $25x^2 = 4$

$25x^2 - 4 = 0$

$(5x-2)(5x+2)=0$

$5x-2=0 \quad 5x+2=0$

$x=2/5 \quad x=-2/5$

Working Backwards: Writing quadratic functions from given zeros.
Use the given set of zeros to write the simplest quadratic function in standard form.

15. 4 and -1

$x=4 \quad x=-1$

$x-4=0 \quad x+1=0$

$(x-4)(x+1)$

$x^2 + 1x - 4x - 4$

$x^2 - 3x - 4$

16. - 5 and $\frac{2}{5}$

$x=-5 \quad x=2/5$

$x+5=0 \quad 5x=2$

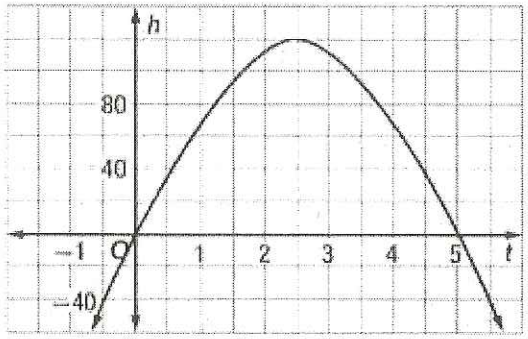
$5x-2=0$

$(x+5)(5x-2)$

$5x^2 - 2x + 25x - 10$

$5x^2 + 23x - 10$

8. David threw a baseball into the air the graph shows the trajectory of the ball where h is height in feet and t is time in seconds. Use this graph to determine how long it took for the ball to fall back to the ground, when the maximum height happened and what the maximum height was.



Max height at 2.5 seconds.

Max height is 120 feet

Hit ground at 5 seconds

9. A catapult launches a projectile on a parabolic arc across a field, use the following function $\mathbf{h(t) = -16t^2 + 64t + 192}$, where "t" is time in seconds and "h" is height in feet to determine when the projectile was at the highest point, what the height of the highest point was, and how long it took to the reach the ground.

When highest Point

Axis of Symmetry

$x = \frac{-64}{2(-16)} = \frac{-64}{-32} = 2$

2 seconds

What Max height

y-value of vertex

Plug in axis of Symmetry

$-16(2)^2 + 64(2) + 192$

$-64 + 128 + 192$

256 feet

How long to hit ground.

x-intercept

x	y
0	192
1	240
2	256
3	240
4	192
5	112
6	0

6 seconds

10. Find the solutions to the following table. If exact roots cannot be found, state the consecutive integers between which the roots are located.

x	$y = x^2 - 2$
-3	7
-2	2
-1	-1
0	-2
1	-1
2	2
3	7

between -2 and -1

between 1 and 2