P.S. #11.2 - Graphing Quadratic Functions from Factored Form

Name: _____ Class: _____

Find the roots of the following functions.

1.) $f(x) = 2(x-5)(x+1)$

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

$\{5, -1\}$

2.) $f(x) = (3x-7)(x+2)$

$0 = (3x-7)(x+2)$

$\{7/3, -2\}$

3.) Consider the function $f(x) = (2x-1)(5-x) - 13 + 8x^2 - 14x$.

a.) Write an equation that defines $f(x)$ as a trinomial.

$f(x) = 10x - 2x^2 - 5 + x - 13 + 8x^2 - 14x$

$f(x) = 6x^2 - 3x - 18$

b.) Solve for x when $f(x) = 0$

$0 = 3(2x^2 - x - 6)$

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

$\{-3/2, 2\}$

For 4 – 7, graph the following functions and identify key features of the graph.

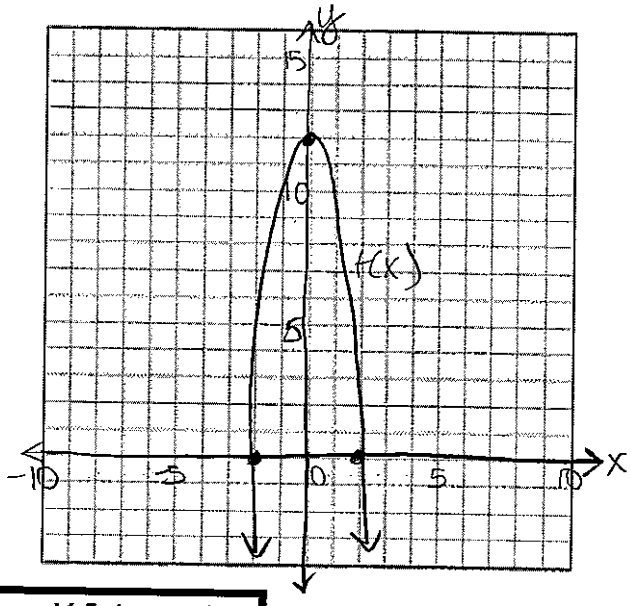
4.) $f(x) = -3(x-2)(x+2)$

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

$\{2, -2\}$

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

$f(0) = -3(-2)(2) = 12$



Roots/Zeros	Axis of Symmetry	Vertex	Y-Intercept
$\{2, -2\}$	$x = 0$	$(0, 12)$	$(0, 12)$

5.) $f(x) = (x+2)(x-5)$

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

$\{-2, 5\}$ – roots

Axis of sym:

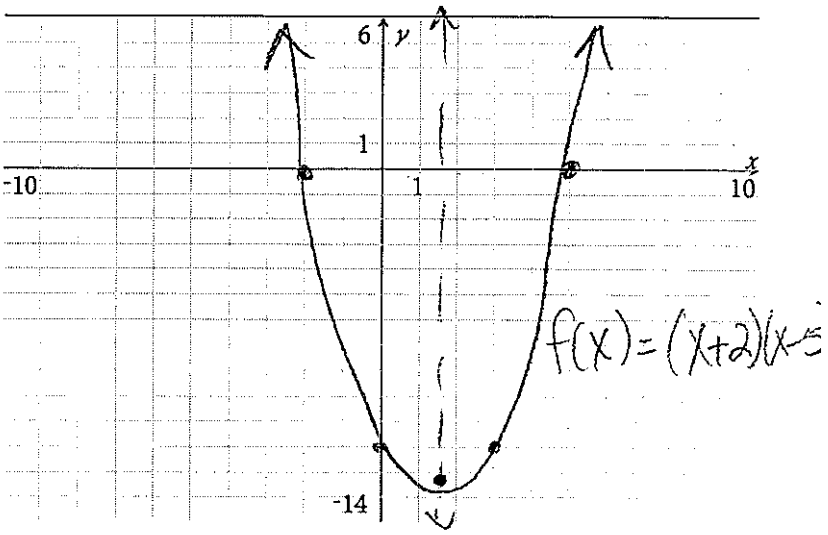
$x = \frac{-2+5}{2} = \frac{3}{2} = 1.5$

vertex:

$f(1.5) = (1.5+2)(1.5-3) = -12.25$

$(1.5, -12.25)$

$x = 1.5$



$f(0) = (0+2)(0-5) = -10$ $(0, -10)$

Roots/Zeros	Axis of Symmetry	Vertex	Y-Intercept
$\{-2, 5\}$	$x = 1.5$	$(1.5, -12.25)$	$(0, -10)$

6.) $g(x) = -x^2 + 5x + 24$

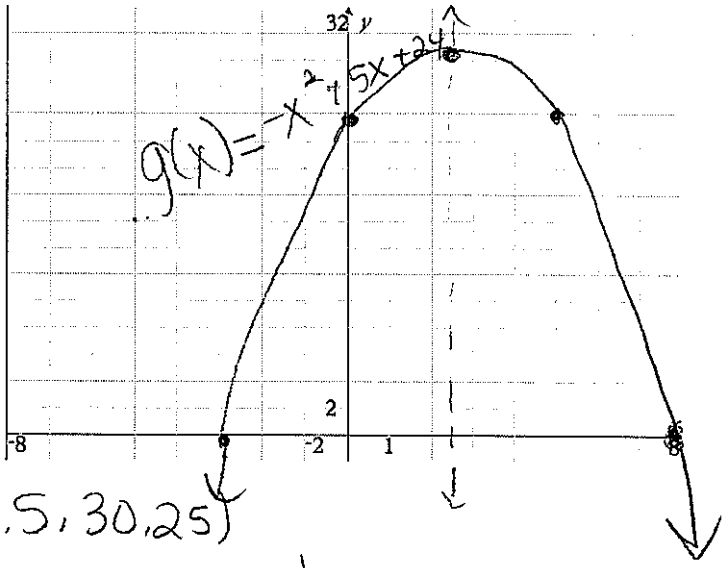
$0 = -(x^2 - 5x - 24)$

$0 = -(x-8)(x+3)$

$\{8, -3\}$ – roots

Axis of sym:

$x = \frac{8+(-3)}{2} = \frac{5}{2} = 2.5$



vertex:

$g(2.5) = -(2.5)^2 + 5(2.5) + 24$ $(2.5, 30.25)$

y-int: $g(0) = -(0)^2 + 5(0) + 24 = 24$ $(0, 24)$

Roots/Zeros	Axis of Symmetry	Vertex	Y-Intercept
$\{8, -3\}$	$x = 2.5$	$(2.5, 30.25)$	$(0, 24)$

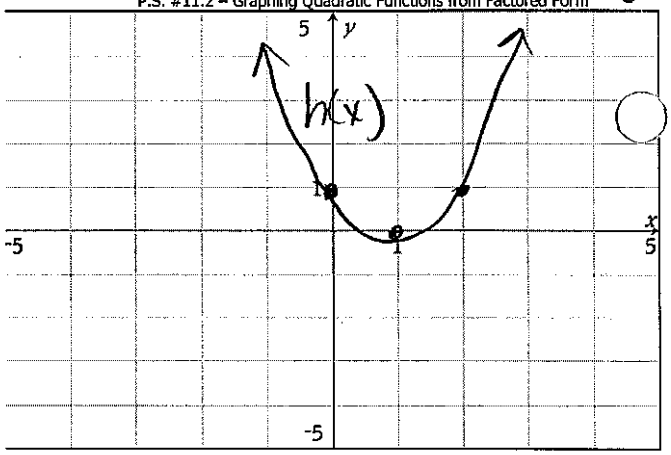
7.) $h(x) = x^2 - 2x + 1$

$0 = (x-1)(x-1)$

$\{1\}$

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

$h(0) = 1$



Roots/Zeros	*Axis of Symmetry*	*Vertex*	*Y-Intercept*
$\{1\}$	$X=1$	$(1,0)$	$(0,1)$

8.) Jack bought 3 slices of cheese pizza and 4 slices of mushroom pizza for a total cost of \$12.50.
Anna
Ally bought 3 slices of cheese pizza and 2 slices of mushroom pizza for a total cost of \$8.50.

What is the cost of one slice of mushroom pizza?

(A) \$1.50 (B) \$2.00 (C) \$3.00 (D) \$3.50

$3c+4m=12.5$
$3c+2m=8.5$
$2m=4$
$m=2$

9.) Given the sequence: $a_1 = 6$ and $a_{n+1} = a_n + 4$.

a.) List the first 5 terms of this sequence.

6, 10, 14, 18, 22

b.) Write an explicit formula for this sequence.

$a_n = a_1 + d(n-1)$
$a_n = 6 + 4(n-1)$
$a_n = 6 + 4n - 4$

$a_n = 4n + 2$

10.) A rocket is launched from a cliff. The relationship between the height, *h*, in feet, of the rocket and the time, *t*, in seconds, since its launch can be represented by the following function:

$$h(t) = -16t^2 + 80t + 384$$

where *x* is the time in seconds the rocket is in the air and the range is the height in feet of the rocket.

a.) Sketch the graph of the motion of the rocket use the key features of the function.

$0 = -16t^2+80t+384$

$0 = -16(t^2-5t-24)$

$0 = -16(t-8)(t+3)$

$\{8,-3\}$

$\{8,-3\}$

$x = \frac{8-3}{2} = \frac{5}{2} = 2.5$

$h(2.5) = -16(2.5)^2+80(2.5)+384$

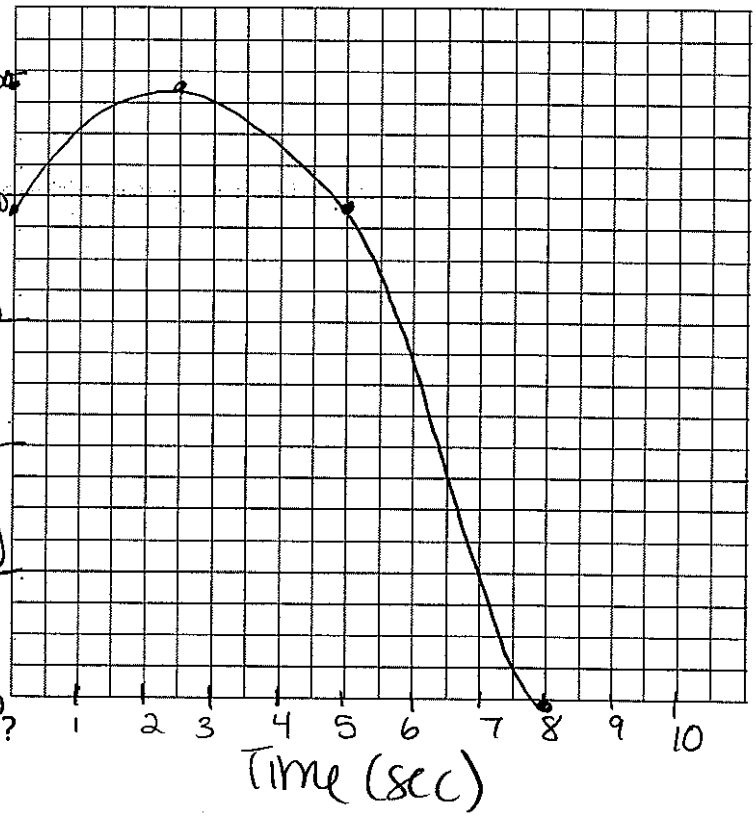
$= 484$

Roots: $\{8,-3\}$

A. of S. $x = 2.5$

vertex: $(2.5, 484)$

y-int: $(0, 384)$



b.) When will the projectile hit the ground?

After 8 sec.

c.) When will the rocket hit the maximum height?

2.5 sec.

d.) What is the maximum height the rocket reaches?

484 ft.

e.) At what height was the rocket launched?

384 ft.