

Name \_\_\_\_\_

**Math 2 Unit 4 Review**

- Rewrite each of these quadratic expression in equivalent standard form.
  - $(x - 8)(x + 1)$
  - $(2x + 9)(x - 2)$
  - $(x - 5)(x + 5)$
  - $(x - 2)^2$
- Factor completely each of these quadratic expressions.
  - $x^2 - 11x + 18$
  - $x^2 - 36$
  - $x^2 - 14x + 49$
  - $x^2 - 7x - 8$
- Graph the following quadratic equation without a calculator. Your graph must include the following critical components: x-intercepts, y-intercept, vertex, directrix, and focus. To receive full credit you must show all of your work for each component:  $y = x^2 + 4x - 12$ 
  - x-intercepts:
  - y-intercept:
  - min/max (vertex):
  - directrix:
  - focus:
- Given the focus (4, 2) and directrix  $y = -4$ .
  - Sketch the graph of the quadratic including focus, directrix and vertex.
  - Write the quadratic equation in vertex form including the correct a value. Show your work.
- Jared stands in the throwing ring to throw his shotput. The shot's heights (in meters above ground),  $x$  second after Jared threw it, is modeled by:  $h(x) = -3x^2 + 3x + 6$ 
  - At what time does the shot hit the ground?
  - Sketch a graph of the situation using the vertex, y-intercept, and x-intercept.

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1. a)  $(x-8)(x+1)$

$x^2 - 7x - 8$

c)  $(x-5)(x+5)$

$x^2 - 25$

b)  $(2x+9)(x-2)$

$2x^2 + 5x - 18$

d)  $(x-2)^2 = (x-2)(x-2)$

$x^2 - 4x + 4$

2. a)  $x^2 - 11x + 18$

$(x-9)(x-2)$

c)  $x^2 - 14x + 49$

$(x-7)^2$

b)  $x^2 - 36$

$(x-6)(x+6)$

d)  $x^2 - 7x - 8$

$(x-8)(x+1)$

3.  $y = x^2 + 4x - 12$

x-int  $\rightarrow (-6, 0)(2, 0)$

y-int  $\rightarrow (0, -12)$

vertex  $\rightarrow (-2, -16)$

directrix  $\rightarrow y = -16\frac{1}{4}$

focus  $\rightarrow (-2, -15\frac{3}{4})$

$y = 1(x+2)^2 - 16$

$d = \frac{1}{4}d$

$d = \frac{1}{4}$

$(x+6)(x-2)$

$x+6=0$

$x-2=0$

$x = -6$

$x = 2$

$x = \frac{-6+2}{2}$

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

(axis of symmetry  $\rightarrow x = -2$ )

$y = (-2)^2 + 4(-2) - 12$

$= 4 - 8 - 12$

$y = -16$

4. focus  $(4, 2)$   $y = -4$

~~$(\sqrt{(y-2)^2 + (x-4)^2})^2 = (\sqrt{(y-4)^2 + (x-x)^2})^2$~~

~~$(y-2)^2 + (x-4)^2 = (y+4)^2 + 0^2$~~

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

~~$\frac{x^2}{12} - \frac{8x}{12} + \frac{4}{12} = \frac{12y}{12}$~~

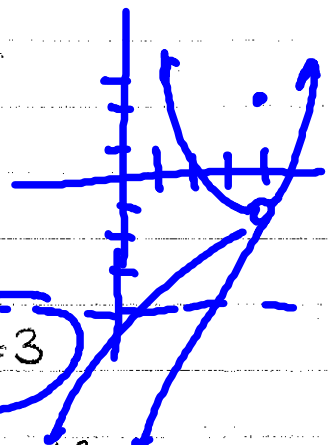
~~$\frac{1}{12}x^2 - \frac{2}{3}x + \frac{1}{3} = y$~~

$\nwarrow$  standard form

$a = \frac{1}{12}$   $d = 3$

$y = \frac{1}{12}(x-4)^2 - 1$

$\nwarrow$  vertex form



$$5. h(x) = -3x^2 + 3x + 6 \rightarrow -3(x^2 - x - 2)$$

$$y\text{-intercept: } (0, 6) \quad -3(x-2)(x+1)$$

$$x\text{-intercept(s): } (2, 0)(-1, 0) \quad x-2=0 \quad x+1=0$$

$$\text{vertex: } \left(\frac{1}{2}, 6\frac{3}{4}\right) \quad x=2 \quad x=-1$$

$$\text{axis of symmetry} \rightarrow x = \frac{2+(-1)}{2} = \frac{1}{2}$$

$$y = -3\left(\frac{1}{2}\right)^2 + 3\left(\frac{1}{2}\right) + 6$$

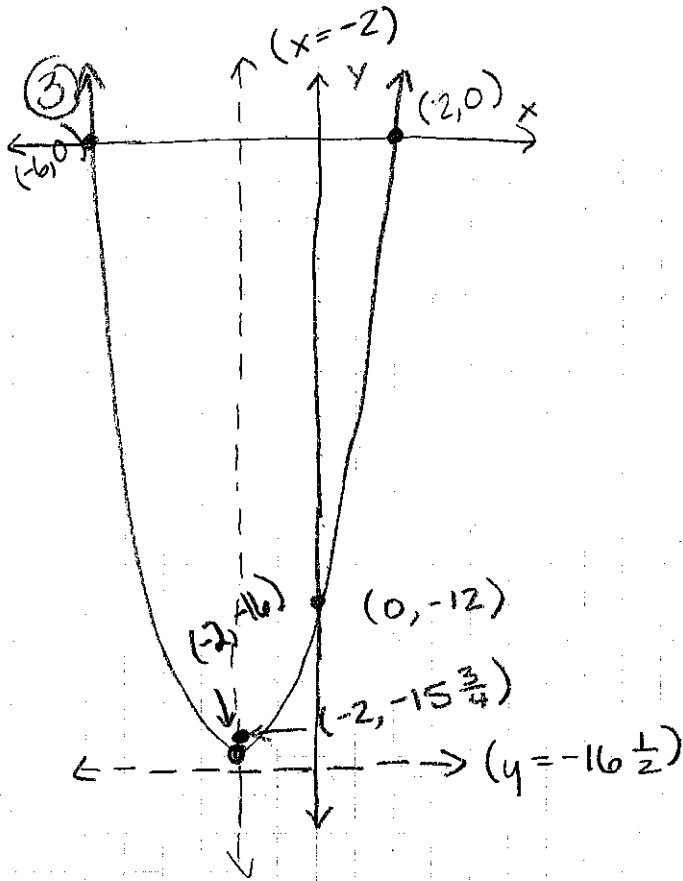
$$= -\frac{3}{1} \cdot \frac{1}{4} + \frac{3}{2} + 6$$

$$= -\frac{3}{4} + \frac{6}{4} + 6$$

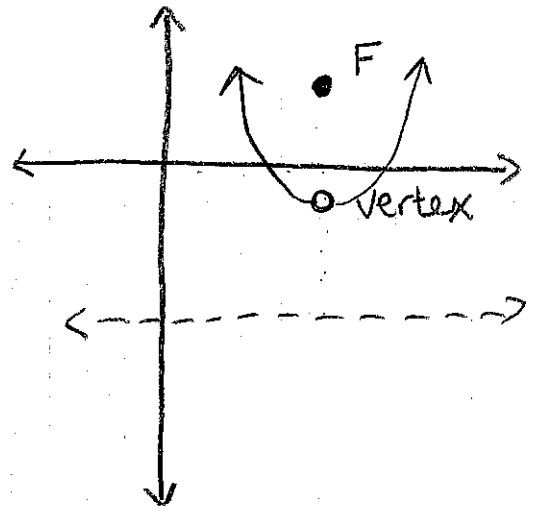
$$= \frac{3}{4} + 6$$

$$= 6\frac{3}{4}$$

a) 2 seconds (it hits the ground)



④



⑤ b)

