

QUADRATIC FUNCTIONS

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

Vertex: (h, k)

$$y = ax^2 + bx + c$$

$$x = -\frac{b}{2a}$$

$y =$ sub in x

$$y = a(x-p)(x-q)$$

$$x-p=0 \quad x-q=0$$

$$\text{x-int} \rightarrow x=p \quad x=q$$

$$\text{Vertex: } x = \frac{p+q}{2}$$

$y =$ sub in x

Direction $+a$ up
 $-a$ down

Line of Sym: $x =$ x-coord of vertex

Width: $|a| > 1$ narrow
 $|a| = 1$ normal
 $0 < |a| < 1$ width

$$(c) \quad y = -2x^2 - 40x + 10$$

$$x = \frac{-b}{2a} = \frac{40}{2(-2)} = -10$$

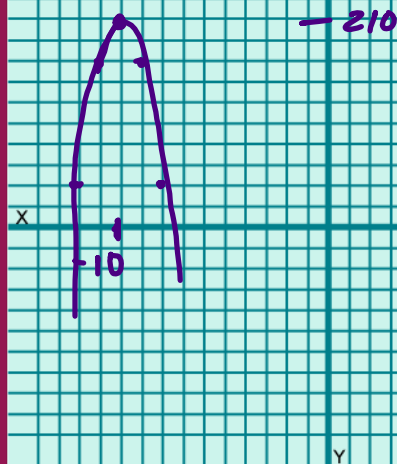
$$y = -2(10)^2 - 40(10) + 10 = 210$$

$(-10, 210)$

0	0
-1	-2
2	-9
3	-18

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

0	0
-1	-1
2	4
3	9



Q16 3(b)

Vertex: $(-8, 2)$

Point: $(-6, 10)$

$$y = a(x+8)^2 + 2$$

$$10 = a(-6+8)^2 + 2$$

$$10 = 4a + 2$$

$$8 = 4a$$

$$2 = a$$

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

Solve by factoring

$$4x^2 - 81 = 0$$

$$(2x+9)(2x-9) = 0$$

$$2x+9=0 \quad 2x-9=0$$

$$2x = -9 \quad 2x = 9$$

$$x = -\frac{9}{2} \quad x = \frac{9}{2}$$

$$10n^2 = 50n$$

$$10n^2 - 50n = 0$$

$$10n(n-5) = 0$$

$$\frac{10n}{10} = 0 \quad n-5 = 0$$

$$n = 0 \quad n = 5$$

Pull
Out
Common
Factors

Completing the Square

$$\frac{5x^2}{5} + \frac{40x}{5} - \frac{15}{5} = \frac{0}{5}$$

$$x^2 + 8x - 3 = 0$$

$$x^2 + 8x + 16 = 3 + 16$$

$$\sqrt{(x+4)^2} = \sqrt{19}$$

$$x+4 = \pm\sqrt{19}$$

$$x = -4 \pm \sqrt{19}$$

Formulas to Know

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Projectile Motion

$$h(t) = \frac{1}{2}at^2 + v_0t + s_0$$

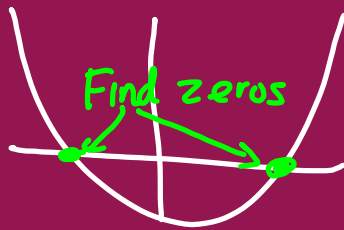
$$a = -9.8 \text{ m/s}^2$$

$$a = -32 \text{ ft/s}^2$$

7/ Solve eq. on calculator

⇒ Graph page

$f_1(x) =$ _____



Menu-6-1

Given roots: $-\frac{3}{7}, 4$

Find eq. (Reverse factoring)

$$\begin{array}{l} x = -\frac{3}{7} \quad x = 4 \\ 7x = -3 \quad x - 4 = 0 \\ 7x + 3 = 0 \end{array}$$

$$(7x + 3)(x - 4) = 0$$

$$7x^2 - 28x + 3x - 12 = 0$$

$$7x^2 - 25x - 12 = 0$$