November 8, 2023

Quadratic Functions Review

No calculator

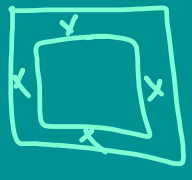
Write:
quadratic formula
projectile motion
$a=-32\frac{ft}{sec^2}$ $a=-9.8\frac{m}{sec^2}$

Review Sheet #1-3

With calculator:

1) Solve quadratics.
   a) factoring (2)
   b) quadratic formula (1)
   c) completing the sq. (1)
   d) Find zeros on calculator graph (1)

2) Find eq. given roots
   $x=4$ $x=-2/5$

3) 3 Word problems
   a) Rev = (# sold)(price)
      Maximize Rev = find Vertex
   b) 
      Solve for x. factoring or quadr. form.
   c) Projectile motion
      a) Maximum height = find Vertex
      b) When does it reach a certain height
         Solve for t. (quadr. formula)

$y < +\frac{1}{2}(x-3)^2 - 6$

Right 3 ↑ down 6

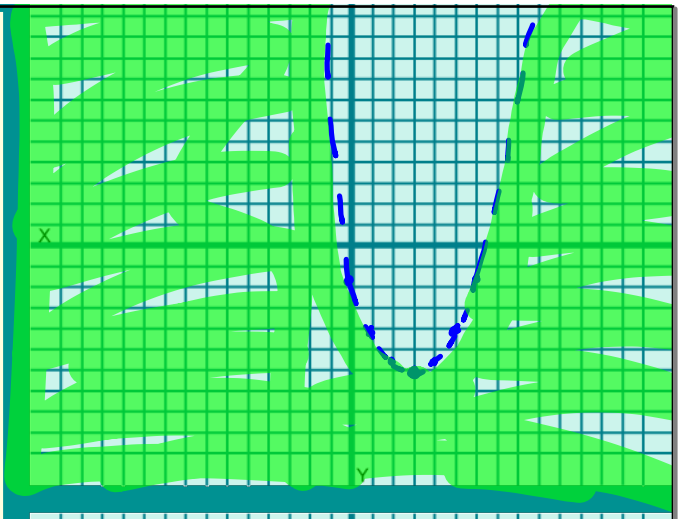
Vertex: $(3, -6)$

Line of Symm.: $x = 3$

Direction: Up

Width: Wide

0	0
1	$\frac{1}{2}$
2	2
3	4.5



$y = -3x^2 + 6x + 7$

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

$y = -3(1)^2 + 6(1) + 7$

$= -3 + 6 + 7 = 10$

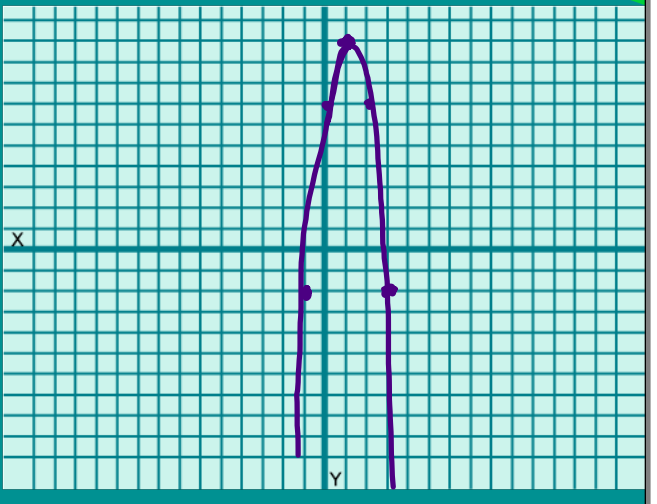
Vertex: $(1, 10)$

Line of Symm.: $x = 1$

direction: Down

Width: narrow

0	0
1	-3
2	-12
3	-27



$y = -\frac{1}{7}(x+6)(x-8)$

$x+6=0 \quad x-8=0$

$x=-6 \quad x=8$

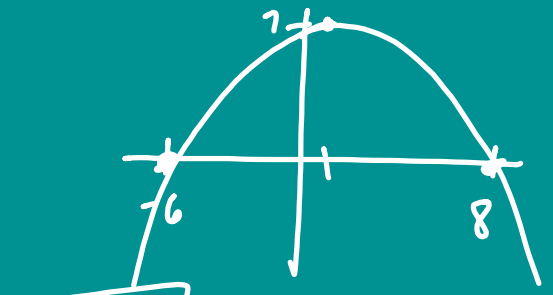
Vertex: $x = \frac{-6+8}{2} = 1$

$y = -\frac{1}{7}(1+6)(1-8)$

$= -\frac{1}{7}(7)(-7)$

$= -\frac{1}{7} \cdot -49$

$= 7$



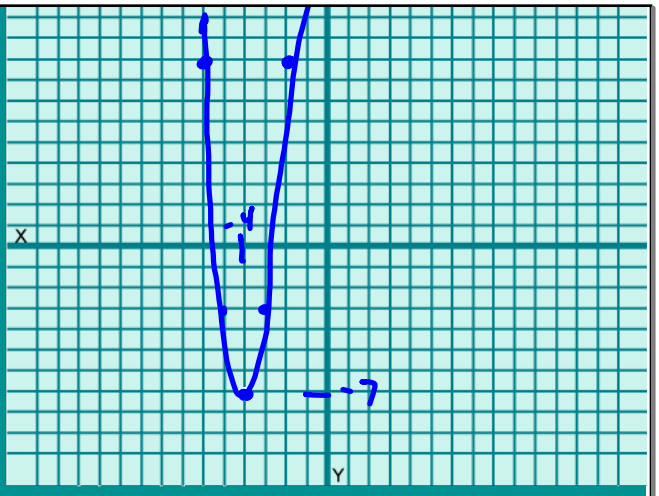
$(1, 7)$

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

$y = a(x+4)^2 - 7$

$y = 4(x+4)^2 - 7$

0	0
1	4
2	4
3	9



Vertex: $(5, 8)$

Point: $(\underset{x}{2}, \underset{y}{-10})$

$y = a(x-5)^2 + 8$

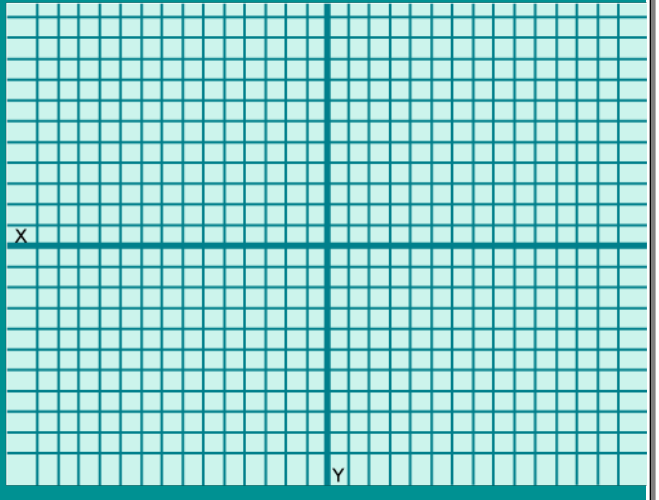
$-10 = a(2-5)^2 + 8$

$-10 = 9a + 8$

$-18 = 9a$

$-2 = a$

$\boxed{y = -2(x-5)^2 + 8}$



SOLVE.

Set = to 0!

a) Factoring

$21 + 11x = 2x^2$

$0 = 2x^2 - 11x - 21$

7 3
1 21

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

$+3x$

$-14x$

$2x+3=0 \quad x-7=0$

$2x=-3 \quad x=7$

$x=-3/2$

$3n^2 = 24n$

$3n^2 - 24n = 0$

$3n(n-8)=0$

$3n=0 \quad n-8=0$

$n=0 \quad n=8$

Find zeros using calculator.

1) Graph eq.
2) Find x-int. using Menu-6-1

$4x^2 - 81 = 0$

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

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

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

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

Completing the square

$$\frac{5x^2}{5} - \frac{30x}{5} + \frac{20}{5} = \frac{0}{5}$$

$$x^2 - 6x + 4 = 0$$

$$x^2 - 6x \underset{-3}{+9} = -4 + 9$$

$$\sqrt{(x-3)^2} = \pm\sqrt{5}$$

$$x - 3 = \pm\sqrt{5}$$

$$\boxed{x = 3 \pm \sqrt{5}}$$

Give exact answer using quadr. form.

$$\frac{-12 \pm \sqrt{(-3)^2 - 4(6)(3)}}{2(6)}$$

$$= \frac{-12 \pm \sqrt{9 - 72}}{12}$$

$$= \frac{-12 \pm \sqrt{-63}}{12} \quad \swarrow 9 \cdot 7$$

$$= \frac{-12 \pm 3i\sqrt{7}}{12}$$

$$= \frac{-4 \pm i\sqrt{7}}{4}$$