October 20, 2025

Forms of Quadratics

Vertex Form

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

Vertex: (h, k)

Line of Symm: $x = h$

Direction: $+a$ up, $-a$ down

Width:

narrow $|a| > 1$

normal $|a| = 1$

wide $0 < |a| < 1$

Standard Form

$y = ax^2 + bx + c$

Vertex:

$x = -b/2a$

$y =$ sub in x-coord

Intercept Form

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

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

$y =$ sub in x-coord.

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

$y = 5(x-3)^2 + 1$ Vertex: $(3, 1)$

$y = 5(x-3)(x-3) + 1$

$y = 5(x^2 - 3x - 3x + 9) + 1$

$= 5(x^2 - 6x + 9) + 1$

$= 5x^2 - 30x + 45 + 1$

$y = 5x^2 - 30x + 46$

$a \quad b \quad c$

$x = \frac{30}{10} = \frac{-(-30)}{2 \cdot (5)} = 3$

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

$y =$ sub in x-coord

$y = 5(3)^2 - 30(3) + 46$

$= 45 - 90 + 46$

$= 1$

$y \geq -\frac{1}{2}x^2 + 6x - 15$

Vertex:

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

$y = -\frac{1}{2}(6)^2 + 6(6) - 15$

$= -18 + 36 - 15$

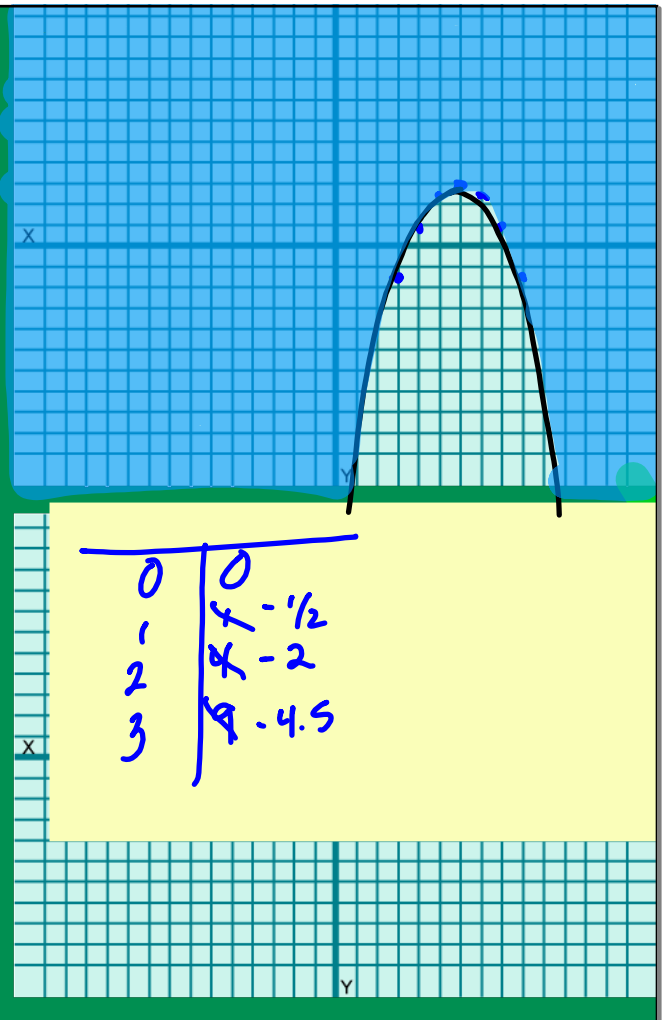
$= 3$

Vertex: (6, 3)

line of symm: $x = 6$

Direction: Down

Width: Wide



0	0
1	-½
2	-2
3	-4.5

Intercept Form

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

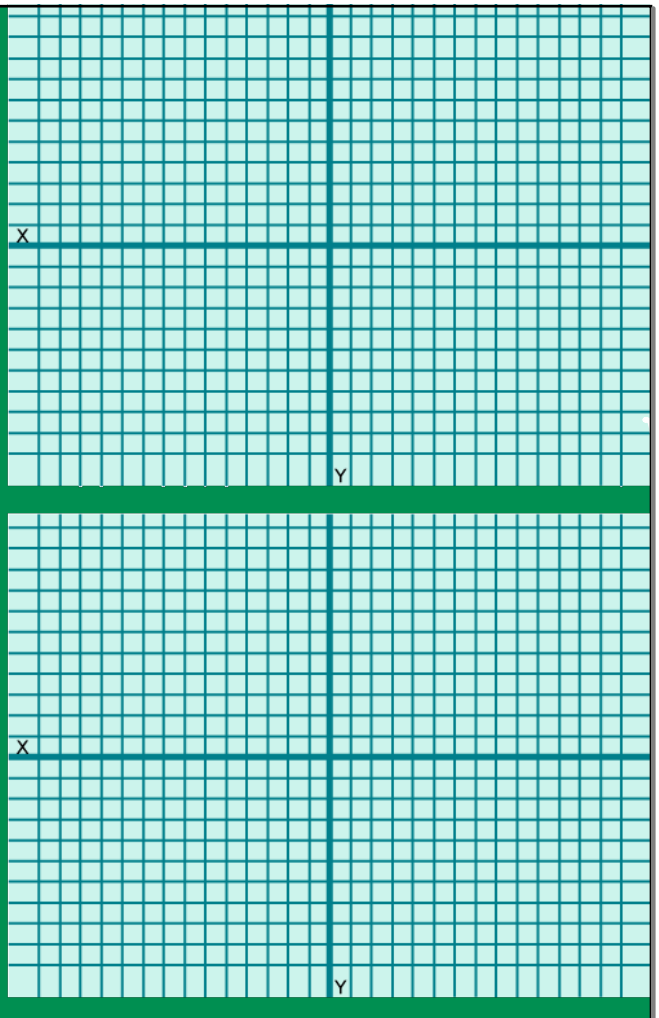
1) Find x-int:

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

$x = p \quad x = q$

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

$y =$ sub in x-coord.



$y > 3(x+2)(x+4)$

Find x-int:

$x+2=0 \quad x+4=0$

$x=-2 \quad x=-4$

Vertex: $x = \frac{-2+-4}{2}$

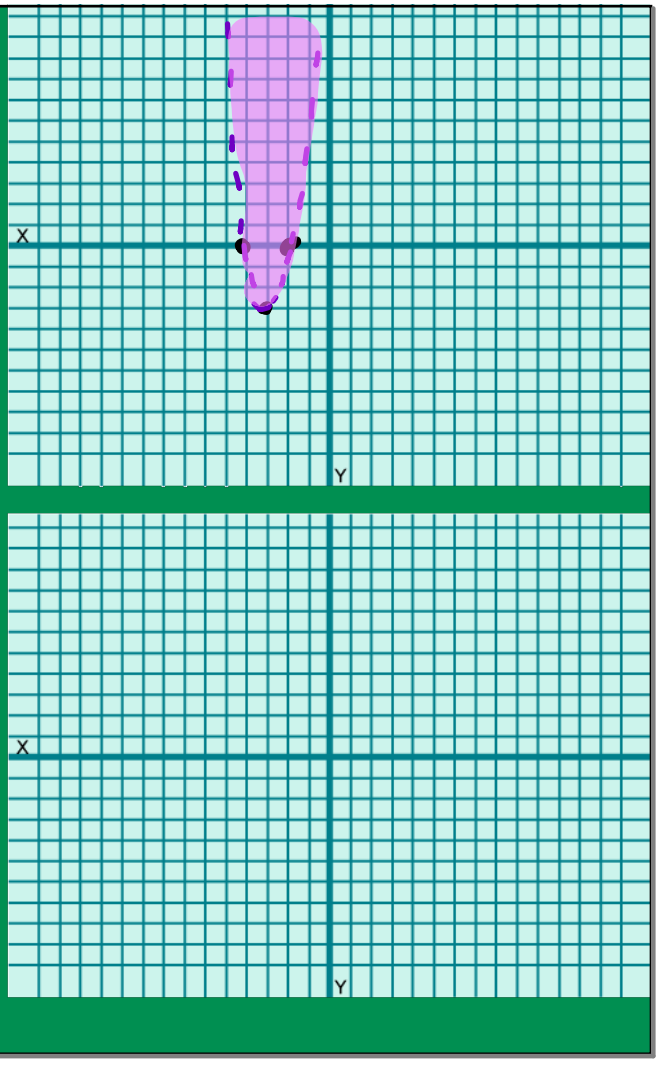
$x = -3$

$y = 3(-3+2)(-3+4)$

$3(-1)(1)$

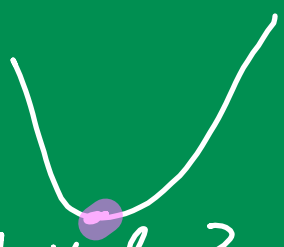
$y = -3$

Vertex: $(-3,-3)$



1972, Mercury Comet = $3200

$V(t) = \underset{a}{18.75}t^2 - \underset{b}{450}t + \underset{c}{3200}$



When did it reach its lowest value?

$t = x = \frac{-b}{2a} = \frac{+(+450)}{2(18.75)} = 12$

1972
+12
1984

What was its lowest value?

Value $= y = 18.75(12)^2 - 450(12) + 3200$

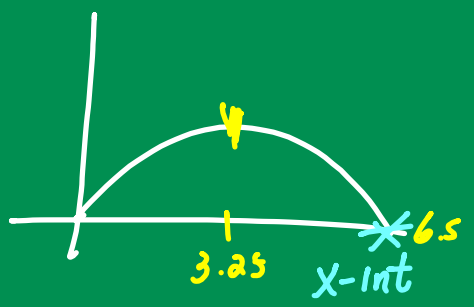
$= \$500$

Woodland jumping mouse

$y = -0.2x(x - 6.5)$

$y = -0.2(x - 0)(x - 6.5)$

$x = 0 \quad x = 6.5$



How far horiz. does mouse jump?

6.5 ft

How high does mouse jump?

$x = \frac{0 + 6.5}{2} = 3.25$

$y = -0.2(3.25)(3.25 - 6.5)$

$= (-0.2)(3.25)(-3.25)$

$y = 2.1125$ ft