

MORE WITH QUADRATICS

Clothing Store

Current: Sell 40 pairs of jeans per day at \$30 ea.

For each \$3 increase in price, Sell 2 less pairs

What price should be charged to Vertex → maximize revenue?

$$\text{Revenue} = 40 * \$30 = \$1200$$

$$\text{Revenue} = (\# \text{ sold})(\text{price})$$

$x = \#$ of \$3 increases

$$\text{Revenue} = (40 - 2x)(30 + 3x)$$

$$R = 1200 + 120x - 60x - 6x^2$$

$$R = -6x^2 + 60x + 1200$$

$$\text{Vertex: } x = \frac{-b}{2a} = \frac{-60}{2(-6)}$$

$$x = 5$$

$$3 \cdot 5 = \$15$$

$$30 + 15 = \$45$$

$$\begin{aligned} \text{price} &= 30 + 3x \\ &= 30 + 3(5) \\ &= \$45 \end{aligned}$$

$$\text{Rev} = 30 \text{ pairs} * \$45 = \$1350$$

$$40 - 2x = 0$$

$$40 = 2x$$

$$20 = x$$

$$30 + 3x = 0$$

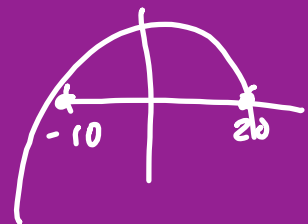
$$3x = -30$$

$$x = -10$$

Vertex:

$$x = \frac{20 + -10}{2}$$

$$x = 5$$



write eq. of parabola

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

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

$$y = -3(x+2)^2 + 5 \left\{ \begin{array}{l|l} 0 & 0 \\ -1 & 0 \\ 2 & 0 \\ 3 & 0 \end{array} \right. - 3$$

Vertex: (5, -3)

Point: (2, -7.5)

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

$$y = a(x-5)^2 - 3$$

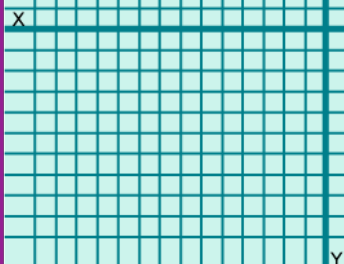
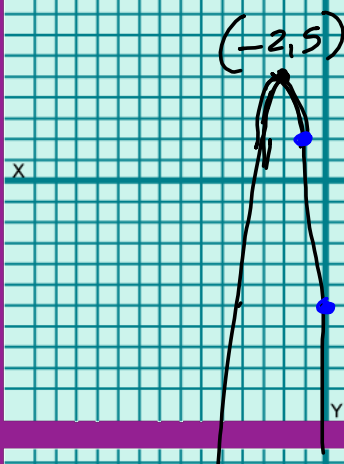
$$-7.5 = a \frac{(2-5)^2}{(-3)^2} - 3$$

$$-7.5 = 9a - 3$$

$$\frac{-4.5}{9} = \frac{9a}{9}$$

$$-0.5 = a$$

$$y = -0.5(x-5)^2 - 3$$



Find the equation of the parabola
 with x -intercepts -2 & 4 .
 Point on parabola at $(-1, 10)$

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

$$y = a(x+2)(x-4) \quad \leftarrow \text{change signs}$$

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

$$10 = a(-1+2)(-1-4)$$

$$10 = a(1)(-5)$$

$$\frac{10}{-5} = \frac{-5a}{-5}$$

$$-2 = a$$

SOLVING QUADRATICS

1) Graph + find the zeros on calculator.

$$\text{Solve } -2x^2 + 107.7x = 1271.12$$

$$-2x^2 + 107.7x - 1271.12 = 0 \quad \left\{ \begin{array}{l} y=0 \\ \text{zeros} \end{array} \right.$$

X-intercepts = Zeros = roots
= solutions

