

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 maximize revenue?

$$\begin{aligned} \text{Revenue} &= 40 \cdot \$30 = \$1200 \\ &38 \cdot \$33 = 1254 \end{aligned}$$

$$R = (40 - 2x)(30 + 3x)$$

$$R = (\overset{\uparrow}{\text{\# sold}})(\overset{\uparrow}{\text{price}}) - 6x^2$$

x = # of \$3 price increases



Intercept

$$\begin{aligned} 40 - 2x &= 0 & 30 + 3x &= 0 \\ 40 &= 2x & 3x &= -30 \\ 20 &= x & x &= -10 \end{aligned}$$

Vertex:

$$x = \frac{20 + -10}{2} = 5$$

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

$$\begin{aligned} R_{\text{max}} &= (40 - 2(5))(30 + 3(5)) \\ &= 30 \cdot 45 \\ &= \$1350 \end{aligned}$$

Standard

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

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

$$x = \frac{-60}{2(-6)} = 5$$

$$\text{Price} = \$30 + \$3(5) = \$45$$

Write eq. of parabola

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

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

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

0	0
1	1
2	4
3	9

-3

Vertex: (5, -3)

Point: (2, -7.5)

Write eq. of parabola

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

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

$$-7.5 = a(2-5)^2 - 3$$

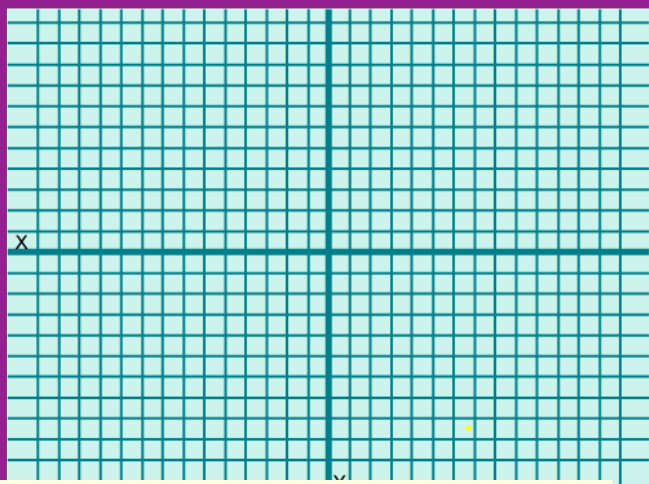
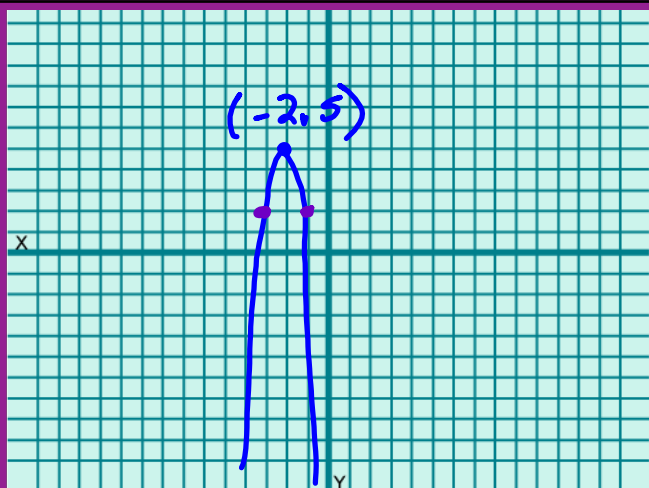
$$-7.5 = 9a - 3$$

$$+3$$

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

$$-0.5 = a$$

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



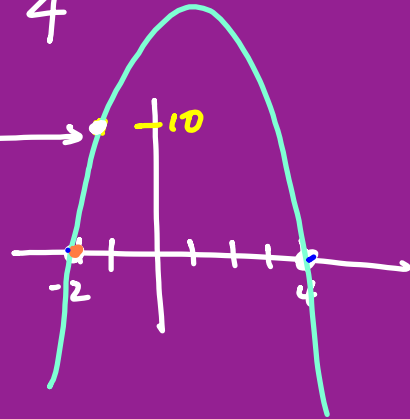
Find the equation of the parabola
 with x -intercepts -2 & 4
 Point on parabola at $(-1, 10)$

Intercept Form

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

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

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



$$* y = a(x+2)(x-4) \longrightarrow y = -2(x+2)(x-4)$$

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

$$10 = a \cdot 1 \cdot -5$$

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

$$-2 = a$$

✓

SOLVING QUADRATICS

1) Graph & find the Zeros on calculator.

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

$$-2x^2 + 107.7x - 1271.12 = 0$$

Find x-intercepts
= solutions
= roots
= zeros

