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? ← Find vertex

x = # of $3 price increases

Revenue = 40 · $30 = $1200

Revenue = (# sold)(price)

$R = (40 - 2x)(\$30 + 3x)$ ~~~ $-6x^2$

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

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

$x = \frac{-b}{2a} = \frac{-60}{2(-6)} = 5$ ← 5 $3 price increases

price = $30 + 3x = \$30 + 3(5) = \$45$

What will revenue be?

$R = (40 - 2(5))(30 + 3(5))$

$= 30 \text{ pairs} \cdot \$45$

$= \$1350$

How many sold

$40 - 2(5) = \boxed{30 \text{ pairs}}$

Revenue = $45 · 30 = $1350

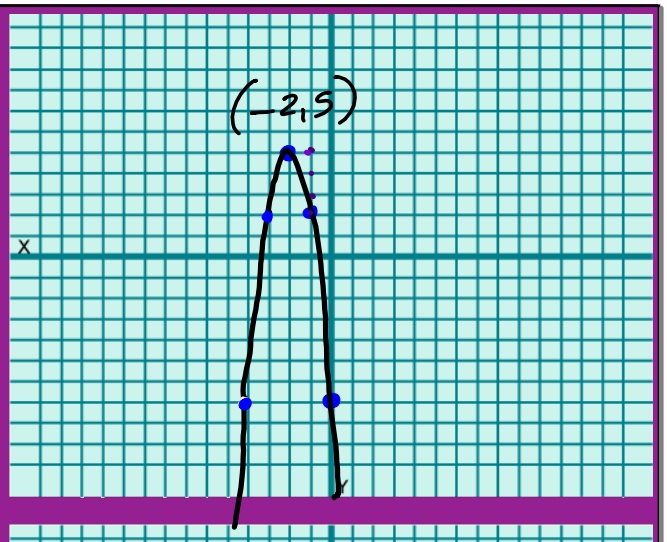
Write eq. of parabola

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

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

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

0	5
1	-3
2	-12
3	-27



Vertex: $(5,-3)$

Point: $(2,-7.5)$ (x, y)

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

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

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

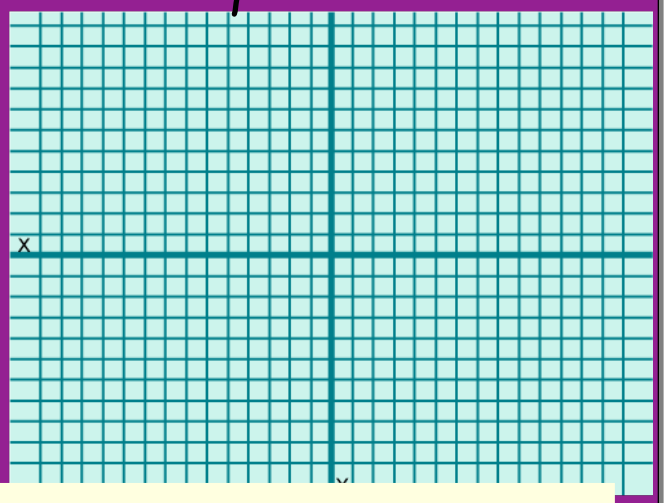
$-7.5 = 9a - 3$

$+3 \quad +3$

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

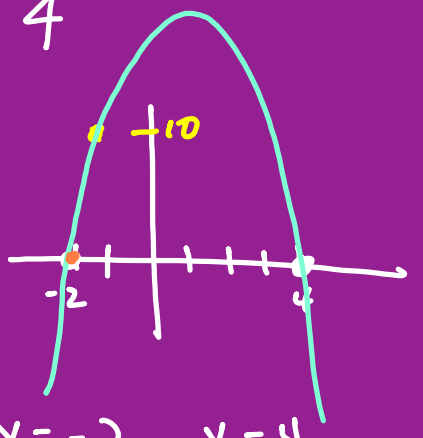
$-\frac{1}{2} = a$

$y = -\frac{1}{2}(x-5)^2 - 3$



Find the equation of the parabola with x-intercepts -2 & 4

Point on parabola at $(-1, 10)$ (x, y)



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

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

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

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

$10 = -5a$

$-2 = a$

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

$x = -2 \quad x = 4$

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

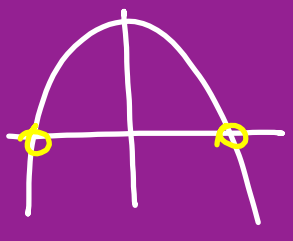
October 25, 2024

SOLVING QUADRATICS

1) Graph & find the x-int on calculator.

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

$-2x^2 + 107.7x - 1271.12 = 0$ ← y=



x-ints = Zeros = Solutions = roots

$x = 17.47, 36.48$

(23.67, 2.87E-11 = 0)

2.87×10^{-11}

.00000000002867