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?

Vertex →

Revenue = 40 * $30 = $1200

Revenue = (# sold)(price)

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

x = # of $3 price increase

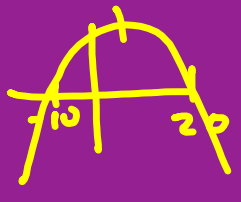
Find vertex!

Intercept Form

$40 - 2x = 0$ $\quad$ $30 + 3x = 0$

$40 = 2x$ $\quad$ $3x = -30$

$20 = x$ $\quad$ $x = -10$



Vertex:

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

Price = 30 + 3x

= 30 + 3(5)

= 30 + 15

= $45

Standard Form

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

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

(c = 1200, b = 60, a = -6)

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

$x = -\frac{b}{2a} = \frac{-60}{2(-6)} = \frac{-60}{-12} = 5$

What will new revenue be?

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

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

$= 30 \cdot 45$

$= \$1350$

Write eq. of parabola

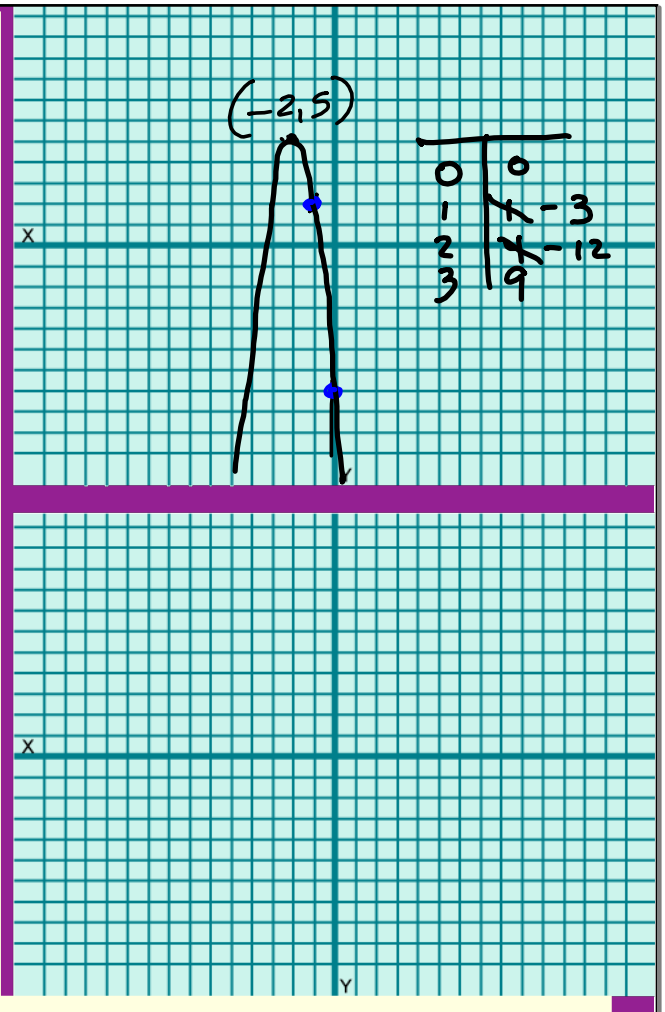
$y = a(x-h)^2 + K$

~~$y = ax^2 + bx + c$~~

$y = a(x-p)(x-q)$ ← If given x-int.

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

$y = -3(x+2)^2 + 5$ ← Used T-table



Vertex: $(5,-3)$

Point: $(\overset{x}{2}, \overset{y}{-7.5})$

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

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

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

$-7.5 = 9a - 3$

$+3 \quad +3$

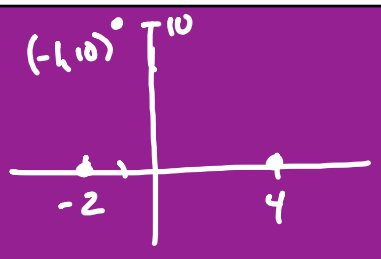
$\frac{-4.5}{9} = \frac{9a}{9}$

$-0.5 = a$

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

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

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



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

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

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

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

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

$-2 = a$

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

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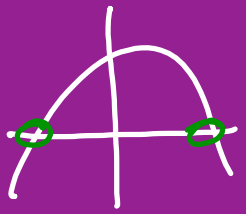
SOLVING QUADRATICS

where $y=0$

1) Graph & find the zeros on calculator.



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

Find x-intercepts!

$f_1(x)=-2x^2+107.7x-1271.12$

$x=17.47,\ 36.48$

Find:

- zeros
- roots
- solutions
- x-int.