GRAPHING QUADRATIC FUNCTIONS

Vertex form

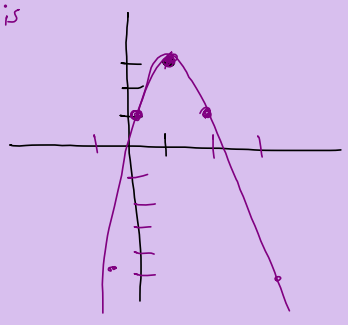
$y = -2(x-1)^2 + 3$

reflect over x-axis

Right 1

Up 3

	$y = x^2$
0	0
1	1
2	4
3	9



Standard form

$y = -3x^2 + 12x - 7$

a b c

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

y = sub in x

Vertex:

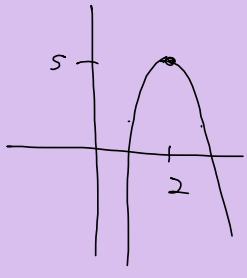
$x = -\frac{b}{2a} = \frac{-12}{2(-3)} = 2$

$y = -3(2)^2 + 12(2) - 7$

$= -12 + 24 - 7 = 5$

Vertex $(2, 5)$

0	0
1	-3
2	-12
3	-27



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

$y = a(x+4)^2 + 5$

0	0
1	1 → −3
2	4
3	9

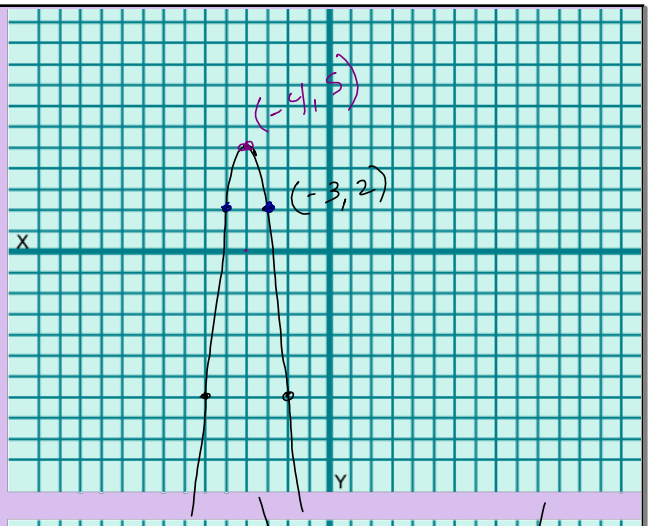
$2 = a(-3+4)^2 + 5$

$2 = a + 5$

$-3 = a$

$y = -3(x+4)^2 + 5$

$y = -3(x+4)^2 + 5$



$y = a(x-4)^2 - 3$

0	0
1	1
* 2	$4 \cdot \frac{1}{4} = 1$
3	9

$-2 = a(6-4)^2 - 3$

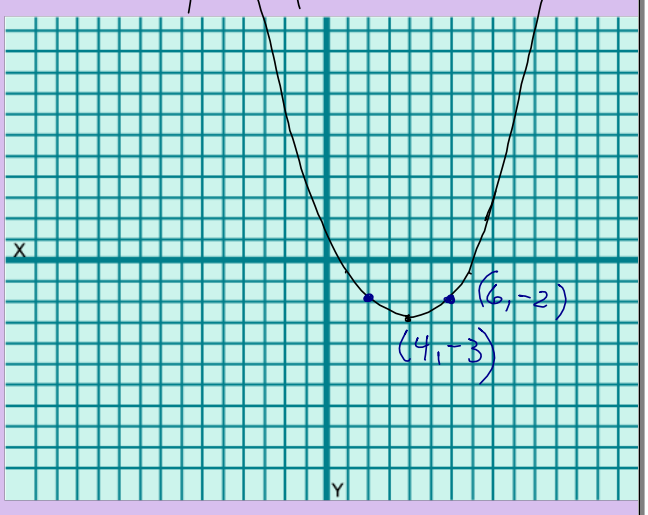
$-2 = a \cdot 4 - 3$

$-2 = 4a - 3$

$1 = 4a$

$\frac{1}{4} = a$

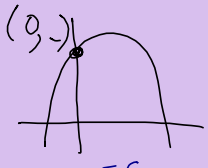
$y = \frac{1}{4}(x-4)^2 - 3$



A manufacturer of grandfather clocks makes a profit on the sale of clocks based on the equation below where P is the profit in dollars and x is the number of clocks manufactured.

$$P(x) = -1.6x^2 + 240x - 375$$

a) Find the y-intercept and interpret its meaning.



$P(0) = 0 + 0 - 375$

$= -375$

If no production, lose $375.

b) Find the x-intercepts and interpret their meaning.

To $0 = -1.6x^2 + 240x - 375$

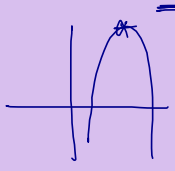
$$x = \frac{-240 \pm \sqrt{240^2 - 4(-1.6)(-375}}{2(-1.6)}$$

$+$ $x = 1.58$ $-$ $x = 148.42$

Where profit = 0

Break even at 1.58 OR 148.4

c) How many clocks should be produced and sold to maximize their profit?



↑ Find vertex.

$$x = -\frac{b}{2a} = \frac{-240}{2(-1.6)} = 75$$

Make 75 clocks

d) How much profit will they make?

Find y.

$P(75) = -1.6(75)^2 + 240(75) - 375$

$= \$8625$

A store currently sells 78 pairs per month of a certain style of shoe at a price of $100 per pair. After doing some market research, the store has determined that for every $5 increase in price, they will sell two less pairs of shoes. What price should be charged to maximize the store revenue?

Current: 78 @ $100
$5 ↑ Sell 2 ↓

Current Rev = 78 · $100 = $7800

Rev = (# sold) · (price)

x = # of $5 price increases

Rev = (# sold)(price)

$R = (78 - 2x)(100 + 5x)$

$R = 7800 - 200x + 390x - 10x^2$

$R = -10x^2 + 190x + 7800$

Vertex

Find vertex:

$x = -\frac{b}{2a} = \frac{-190}{2(-10)} = 9.5$ ← $5 price increases

Price = $100 + 5 \cdot 9.5$
= $147.50

Maximum Revenue:

$R(9.5) =$