Week 5 Monday

February 1, 2019 10:16 AM

Quiz tomorrow 3.5

Test Average: 79%

Complete List of Sugg HW Problems : www.leahhoward.com

Equations

$3 = 2x - 1$

Solution : $x = 2$

Functions

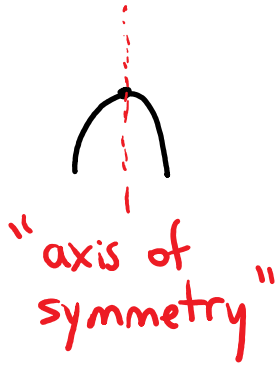
$y = 2x - 1$ or $f(x) = 2x - 1$

x	y
-1	-3
0	-1
1	1
⋮	

4.3 Quadratic Functions (Parabolas)

$f(x) = ax^2 + bx + c$

$a > 0$	$a < 0$
Parabola opens up	Parabola opens down
Vertex is the lowest point	Vertex is the highest point



Axis of Symmetry for a parabola is $x = \frac{-b}{2a}$

Know this

Ex: Find the vertex for

$y = 2x^2 + 6x + 10$

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

$= \frac{-6}{4}$

$= \frac{-3}{2}$

2) $x = -\frac{3}{2} \rightarrow y$

$y = 2x^2 + 6x + 10$

$y = 2\left(\frac{-3}{2}\right)^2 + 6\left(\frac{-3}{2}\right) + 10$

$y = 2\left(\frac{9}{4}\right) \quad \frac{-18}{2} + \frac{20}{2}$

$y = \frac{11}{2}$

Vertex $= \left(-\frac{3}{2}, \frac{11}{2}\right)$

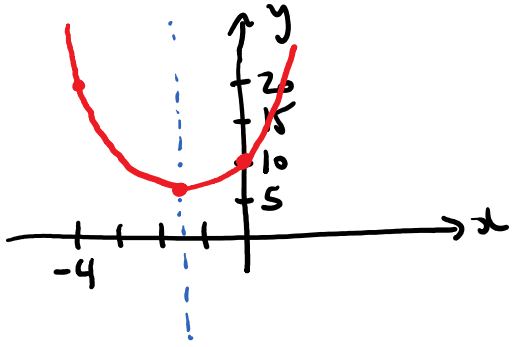
Ex: Graph $y = 2x^2 + 6x + 10$

1) Vertex $= \left(-\frac{3}{2}, \frac{11}{2}\right)$

2) Plot 2 more points

x	$y = 2x^2 + 6x + 10$
-4	18
0	10

$2(-4)^2 + 6(-4) + 10$



Standard Form of a Parabola

Standard Form of a Parabola

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

Vertex $= (h, k)$

Know this

Ex: Parabola has vertex $= (-2, 6)$ and passes through $(1, 51)$.

Find $y = ax^2 + bx + c$. ← "general form"

1) Vertex $= (-2, 6)$

$h = -2 \quad k = 6$

Standard Form $\quad y = a(x-h)^2 + k$

$y = a(x+2)^2 + 6$

2) Get a : Sub $x = 1 \quad y = 51$

$51 = a(3)^2 + 6$

$45 = 9a$

$5 = a$

3) Standard Form : $\quad y = 5(x+2)^2 + 6$

4) Expand

$y = 5(x^2 + 4x + 4) + 6$

$y = 5x^2 + 20x + 20 + 6$

$y = 5x^2 + 20x + 26$

RECAP

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

Ex: $f(x) = -3x^2 + 3x - 2$

a) Does $f(x)$ have a maximum or minimum value?

$a < 0$

$f(x)$ has a max.

$f(x)$ does not have a min.

b) Find the extreme value (max. or min.)

→ Find the vertex

$$x = \frac{-b}{2a} = \frac{-3}{2(-3)} = \frac{-3}{-6} = \frac{1}{2}$$

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

$$= -3\left(\frac{1}{2}\right)^2 + 3\left(\frac{1}{2}\right) - 2$$

$$= -3\left(\frac{1}{4}\right) + \frac{6}{4} - \frac{8}{4}$$

$= \frac{-5}{4}$

Vertex $= \left(\frac{1}{2}, \frac{-5}{4}\right)$

$f(x)$ has a maximum of $\frac{-5}{4}$ at $x = \frac{1}{2}$