

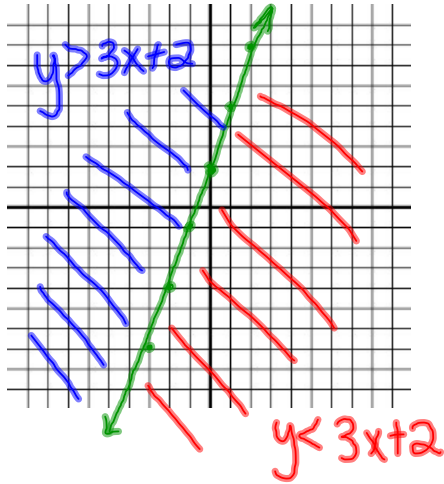
# Alg III 3.3 lesson

Chapter 3  
Section 3 notes

## INEQUALITIES IN TWO VARIABLES

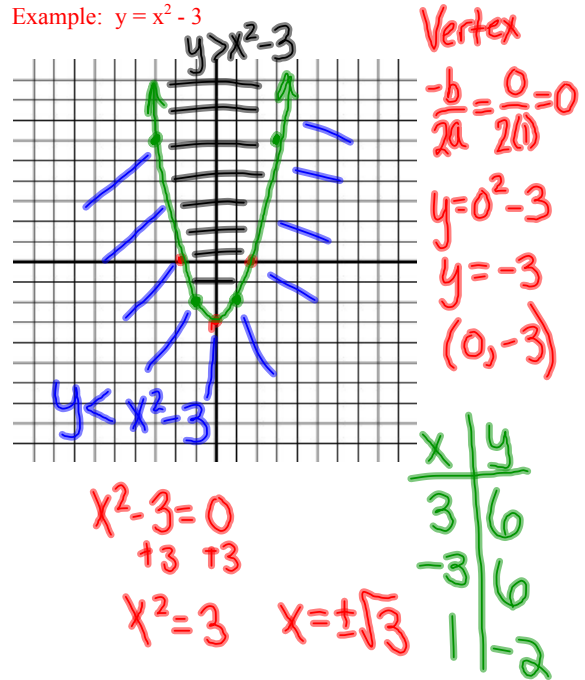
### Linear Equation vs. Inequality

Example:  $y = 3x + 2$



### Quadratic Equation vs. Inequality

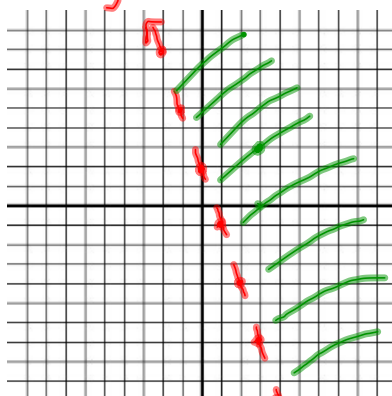
Example:  $y = x^2 - 3$



### Examples

Graph each of the following inequalities.

#1  $y + 3x > 2$   
 $-3x \quad -3x$   
 $y > 2 - 3x$   
 \*linear  
 $y = mx + b$

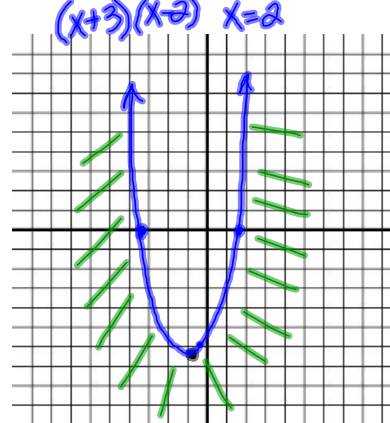


$(3, 3)$   
 $3 > 2 - 3(3)$   
 $3 > -7$  True = shade

$(0, 0)$   
 $0 \leq 0^2 + 0 - 6$   
 $0 \leq -6$  False  
 → No shading

> < DASH ← - - - - - >  
 > < Solid ← - - - - - >

#2  $y \leq x^2 + x - 6$   
 $x^2 + x - 6 = 0 \quad x = -3$   
 $(x + 3)(x - 2) \quad x = 2$   
 $-\frac{b}{2a} = \frac{-1}{2(1)} = -\frac{1}{2} = x$

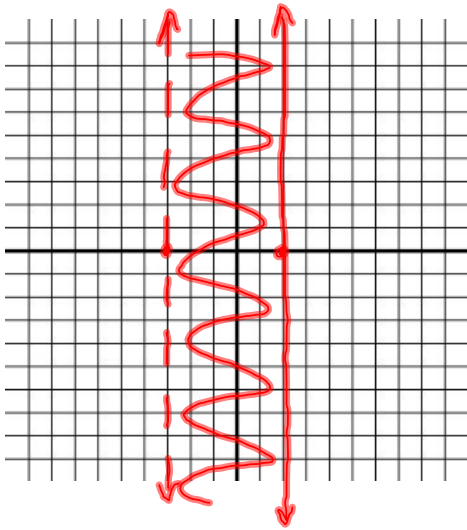


$(-\frac{1}{2})^2 + \frac{1}{2} - 6$   
 $= -6.25$   
 $(-\frac{1}{2}, -6.25)$   
 Vertex

Alg III 3.3 lesson

#3  $-3 < x \leq 2$

Dash  $\leftarrow$   $\rightarrow$  solid

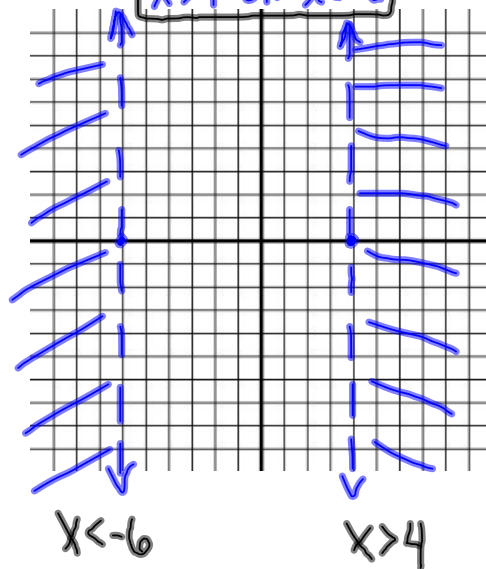


$x = \#$   $\updownarrow$  vertical

#4  $|x + 1| > 5$

$x + 1 > 5$  OR  $x + 1 < -5$

$x > 4$  OR  $x < -6$



$x < -6$

$x > 4$

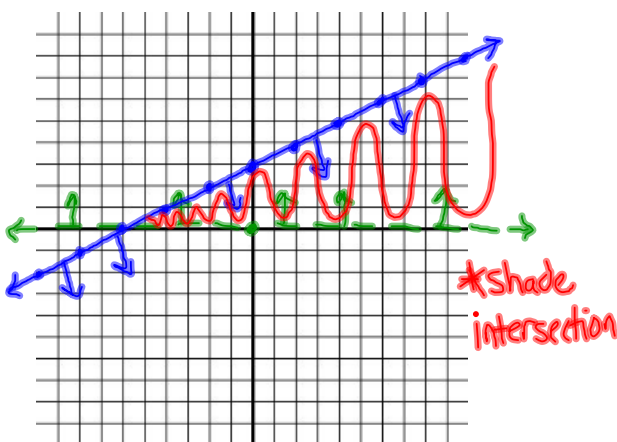
OR  $\rightarrow$  "wings"

#5  $y > 0$  Horizontal

$x - 2y \geq -6$

$-x$   $-x$

$\frac{-2y \geq -6 - x}{-2} \quad y \leq 3 + \frac{1}{2}x$



\*shade intersection

$(0, 0) \quad 0 \leq 3 + \frac{1}{2}(0)$

Test a point  $0 \leq 3$  True = Shade where  $(0, 0)$  is

#6  $y > x^2 - 4$

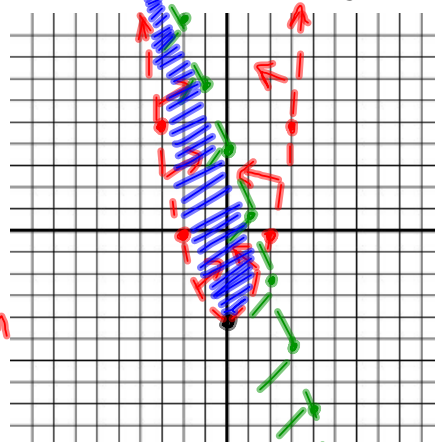
$3x + y < 4$

$-3x$   $-3x$   
 $y < 4 - 3x$

$\frac{-b}{2a} = \frac{0}{2(0)} = 0 = x$

$0^2 - 4 = -4 = y$

Vertex  $(0, -4)$



$x^2 - 4 = 0$   
 $(x-2)(x+2)$   
 $x = 2 \quad x = -2$

x	y
3	5
-3	5

p106  
#2-22 *evens*