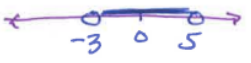
Pick Up the Warm Up

HW Tally

1 Write the inequality that represents each graph

$x < 5$

$x \geq -2$



$-3 < x < 5$

$x \leq -1$ or $x \geq 3$

Single Variable Inequality

answer can be displayed on a number line

Method 1

Solve directly (if possible)

Method 2

A) find boundary points
B) TEST a point or two

Solve the inequality using either method or solve using both methods if you want the practice).

Boundary Point Method

$\frac{1}{2x} > \frac{1}{2} - \frac{2}{5x}$

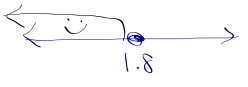
$10x\left(\frac{1}{2x}\right) > 10x\left(\frac{1}{2}\right) - 10x\left(\frac{2}{5x}\right)$

$5 > 5x - 4$

$+4 \quad +4$

$9 > 5x$

$x < \frac{9}{5}$ or 1.8 (boundary point)



test $x = 1$

$\frac{1}{2(1)} > \frac{1}{2} - \frac{2}{5(1)}$

$\frac{1}{2} > \frac{5}{10} - \frac{4}{10}$

$\frac{1}{2} > \frac{1}{10}$ ☺

$x < 1.8$

Direct (if possible)

$10x\left(\frac{1}{2x}\right) > 10x\left(\frac{1}{2}\right) - 10x\left(\frac{2}{5x}\right)$

$5 > 5x - 4$

$\frac{9}{5} > \frac{5x}{5}$

$1.8 > x$

$x < 1.8$

Boundary Point Method

$$\frac{1}{2x} - > \frac{1}{2} - \frac{2}{5x}$$

Direct (if possible)

$$\frac{1}{2x} - > \frac{1}{2} - \frac{2}{5x}$$

(3) $|x-3| \leq 2x-12$

by boundary point method.

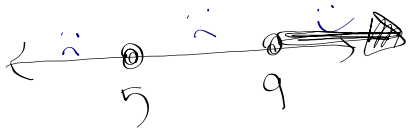
$|x-3| = 2x-12$

$x-3 = 2x-12$ $\quad$ $x-3 = -(2x-12)$

$-3 = x-12$ $\quad$ $3x-3 = 12$

$+12 \quad +12$ $\quad$ $3x = 15$

$9 = x$ $\quad$ $x = 5$



test

$x=3$ $\quad |3-3| \leq 2(3)-12$, $0 \leq -6$ ☹

$x=6$ $\quad |6-3| \leq 2(6)-12$, $3 \leq 0$ ☹

$x=10$ $\quad |10-3| \leq 2(10)-12$, $7 \leq 8$ ☺

$x \geq 9$

(4) Solve $(x-4)^3 + 6 \leq x-4$

is so complex we won't be able to use either method. So we'll have to be happy with an approximate answer.

Strategy: Break the L and R side into a system and analyze the graph.

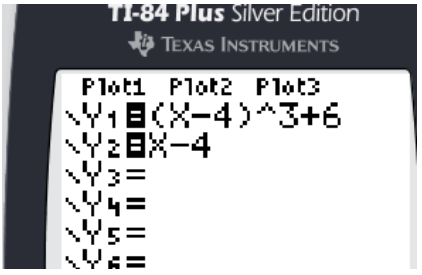
$(x-4)^3 + 6 = x-4$

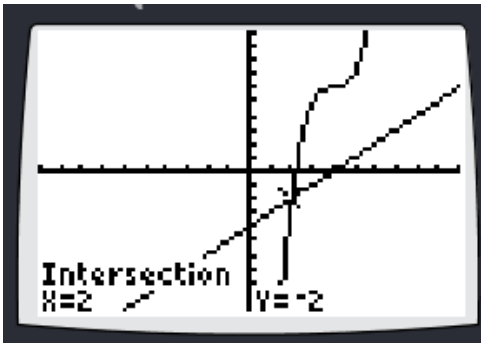
$(x-4)^3 + 6 \leq x - 4$

1. Graph to find the intersections of the Left and Right Functions

2. Find the boudary point(s), mark on a number line.

3. Test a point. Decide which area to shade.





Reminders

Ch 4 Test Information Sheet

Check the HW

from both assignments

completing the square to solve the equation

#70

70) $x^2 + 12x + 15 = 75$

$-15 \quad -15$

Solve by completing the square

$x^2 + 12x + 36 = 60 + 36$

$(x+6)^2 = 96$

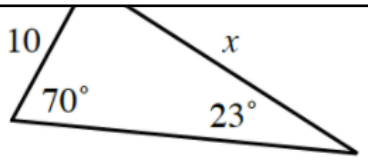
$x + 6 = \pm\sqrt{96}$

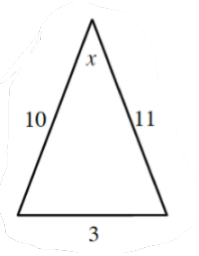
$\left(\frac{12}{2}\right)^2$

$x =$

$2x + y = 12$

$xy = 16$





QUESTIONS ON HW

67

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

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

67 a) $5-(y-3)=3x$

$-5 \qquad -5$

$-(y-3)=3x-5$

$-y+3=3x-5$

$-3 \qquad -3$

$-1y=3x-8$

multiply all terms by (-1)

$y=-3x+8$

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

$y=-x-\frac{1}{2}$

68 A

$(y-3)^2 = 2y-10$

$(y-3)(y-3) = 2y-10$

$y^2-3y-3y+9 = 2y-10$

$y^2-6y+9 = 2y-10$

$y^2-8y+19 = 0$

So now try the Quadratic Formula

$a=1 \quad b=-8 \quad c=19$

$a=1 \quad b=-8 \quad c=19$

$$X = \frac{-(\ ) \pm \sqrt{(\ )^2-4(X)}}{2(\ )}$$

64 d

$$\frac{2m^2+7m-15}{m^2-16} \cdot \frac{m^2-6m+8}{2m^2-7m+6}$$

$$\frac{(m+5)(2m-3)}{(m+4)(m-4)} \cdot \frac{(m-2)(m-4)}{(m-2)(2m-3)}$$

65a $3x+2 \geq x-6$

Bound. Pts

$3x+2 = x-6$

$-x \quad -x$

$2x+2 = -6$

$-2 \quad -2$

$2x = -8$

$x = -4$

$x \geq -4$

test $x = 0$

$3(0)+2 \geq (0)-6$

$2 \geq -6$

true

65b $2x^2 - 5x < 12$

$2x^2 - 5x = 12$

$2x^2 - 5x - 12 = 0$

$(2x+3)(x-4) = 0$

$2x+3=0 \quad x=4$

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

$2(0)^2 - 5(0) < 12$

$0 < 12$

true

66a $|2x+3| < 5$

$2x+3 < 5 \quad 2x+3 > -5$

find boundary points by solving $|2x+3| = 5$

$2x+3=5 \quad 2x+3=-5$

$x=1 \quad x=-4$

TEST $x=-2$

$|2(-2)+3| < 5$

$|-4+3| < 5$

$|-1| < 5$

$1 < 5$ true

B.B.

Aim: Solve/graph

Two Variable Inequalities

and systems

Is x = -4 solution to....

$y \geq 2x^2 + 5x - 3$

Whaaaaat ?

true

In that case is (-3, 0) a solution ? to....

$y \geq 2x^2 + 5x - 3$

$0 \geq 2(-3)^2 + 5(-3) - 3$

$0 \geq 18 - 15 - 3$

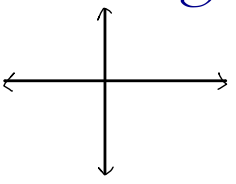
$0 \geq 0$

true

but there a few more

an infinite number to be exact

We'll show them graphically



To solve a 2-variable inequality:

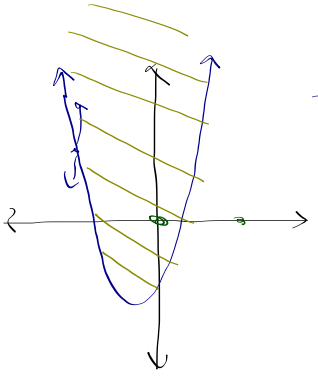
1. Change to an equation.
2. Solve for y (if possible)
3. Graph the boundary function.
4. Then test a point, above or below,
5. Then shade the appropriate side.

Plan: we'll do a few schematically

Then on grid paper

(A) Solve $y \geq 2x^2 + 5x - 3$

$y = 2x^2 + 5x - 3$ ← boundary curve



test (0,0) $0 \geq 2(0)^2 + 5(0) - 3$

$0 \geq -3$ ✓

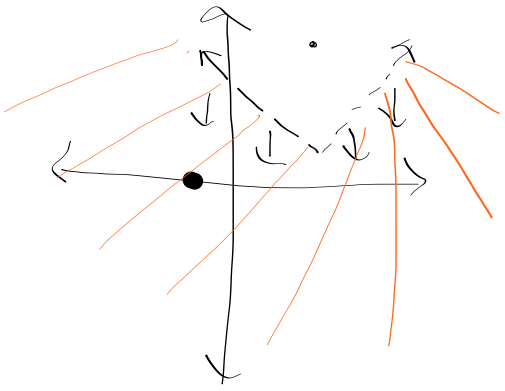
test (5,0) $0 \geq 2(5)^2 + 5(5) - 3$

$0 \geq 50 + 25 - 3$

$0 \geq 72$ ✗

(B) $y < |x-3| + 1$

$y = |x-3| + 1$



$(-1,0)$ $0 < |-1-3| + 1$

$0 < |-4| + 1$

$0 < 5$ ☺

$(3,6)$

(C) Solve A system

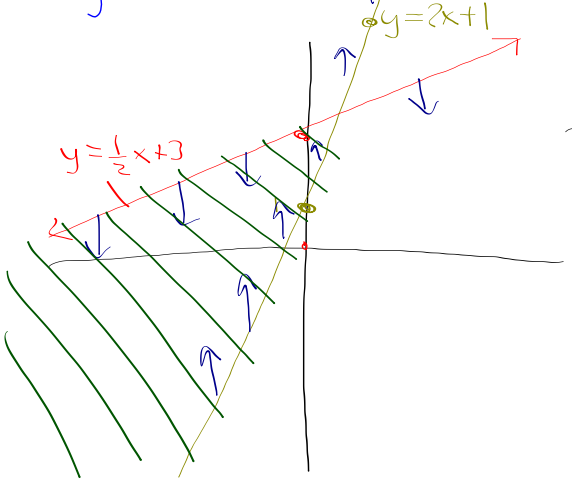
$y \geq 2x+1$

$y \leq \frac{1}{2}x + 3$

for $y = 2x+1$ $(0,0)$

$0 \geq 2(0)+1$

$0 \geq 1$ ☹



for $y = \frac{1}{2}x + 3$

$(0,0)$

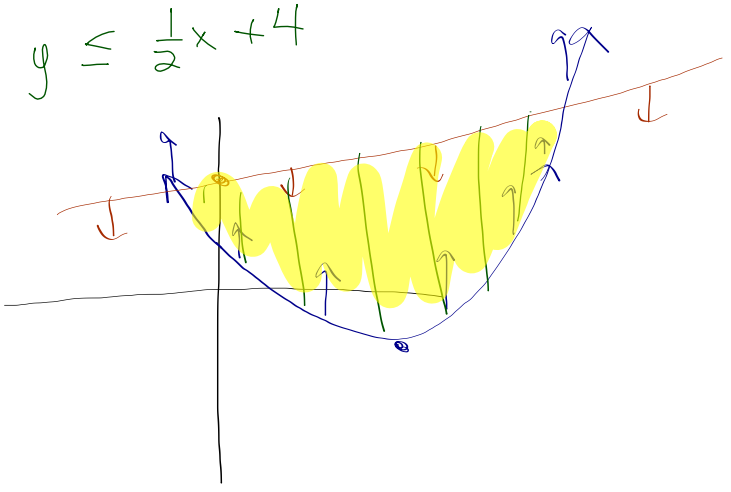
$0 \leq \frac{1}{2}(0)+3$

$0 \leq 3$ ☺

(D) with the help of GDC

$y \geq 0.2(x-5)^2 - 2$

$y \leq \frac{1}{2}x + 4$



B.3.

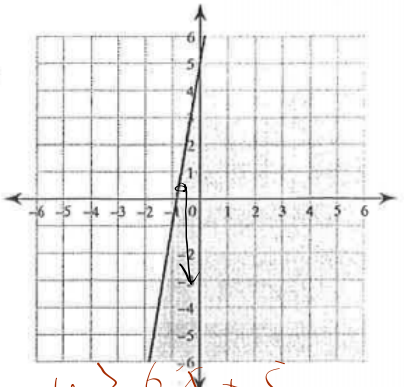
NOW ON GRAPH paper

Pick Up the Classwork

NOW the reverse

Determine the 2-variable Inequalities

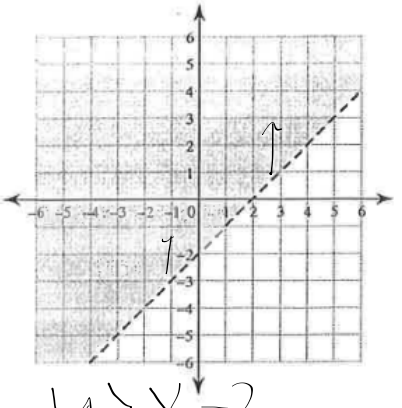
A.



$y \geq 6x + 5$

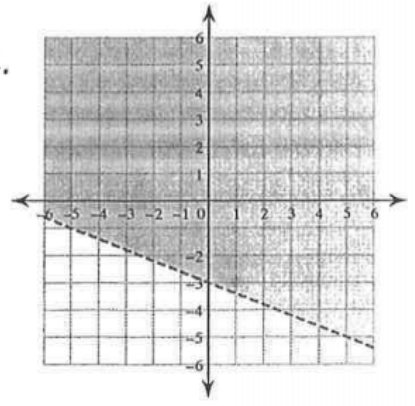
$y \leq 6x + 5$

B.



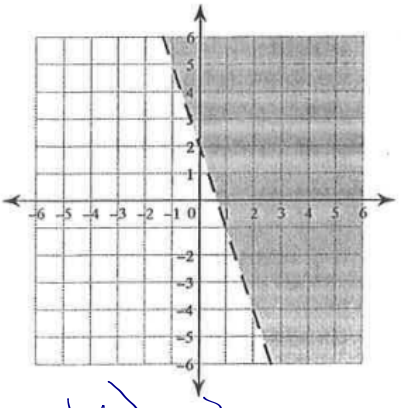
$y > x - 2$

C.



$y > -\frac{2}{5}x - 3$

D.



$y > -3x + 2$

LCQ

4 .... 73ab, 74 , 76-77, 84, 87