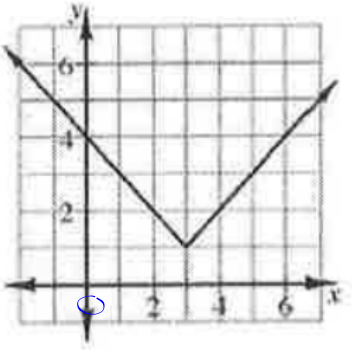
hw → tally

reminder

No Warm Up

Chapter 4 Test is next Wednesday or Thursday, probably Thursday

Q Examine the graph of $f(x) = |x-3|+1$ at right. Use the graph to find the values listed below.



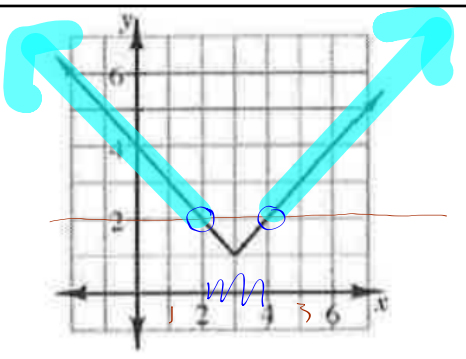
a. $f(3)$ = 1

b. $f(0)$ = 4

c. $f(4)$ = 2

d. $f(-1)$ = 5

(2) Use the graph of $f(x)=|x-3|+1$ to solve the equations and inequalities below.



a. $|x-3|+1=1$ $X=3$

b. $|x-3|+1\leq 4$ $0\leq X\leq 6$

c. $|x-3|+1=3$ $X=5$ $X=1$

d. $|x-3|+1>2$ $-\infty<x<2,\ 4<x<\infty$

homework check

52 check $x=-1$

$2x^2+5x-3 \leq x^2+4x+3$

$2(-1)^2+5(-1)-3 \leq (-1)^2+4(-1)+3$

53

a $5-3\left(\frac{1}{2}x+2\right)=-7$

b $5\left[\sqrt{x-2}+1\right]=15$

c $12 - \left(\frac{2}{3}x + x\right) = 2$

d $-3(2x+1)^3 = -192$

$(2x+1)^3 = 64$

68a $(y-3)^2 = 2y-10$

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

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

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

64
76
140

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

$x = \dfrac{-(-8) \pm \sqrt{(-8)^2-4(1)(19)}}{2(1)} = \dfrac{8 \pm \sqrt{-12}}{2}$

68b $|y-3| = 2y-10$

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

$y-3 = -2y+10$

69a $\frac{x-4}{2x^2+9x-5} + \frac{x+3}{x^2+5x}$ Factor

$\frac{x-4}{(2x-1)(x+5)} + \frac{x+3}{x(x+5)}$

$\frac{x(x-4)}{x(2x-1)(x+5)} + \frac{(x+3)(2x-1)}{x(x+5)(2x-1)}$

$\frac{x^2-4x+(x+3)(2x-1)}{x(2x-1)(x+5)}$

$\frac{x^2-4x+2x^2-x+6x-3}{x(2x-1)(x+5)} \rightarrow \frac{3x^2+x-3}{x(2x-1)(x+5)}$

69c $\frac{(x+4)(2x-1)(x-7)}{(x+8)(2x-1)(3x-4)} \div \frac{(4x-3)(x-7)}{(x+8)(3x-4)}$

$\frac{(x+4)(x-7)}{(x+8)(3x-4)} \cdot \frac{(x+8)(3x-4)}{(4x-3)(x-7)}$

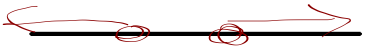
The AIM

for the next few days...

1. Solve single variable inequalities
2. Graph two variable inequalities
3. Solve systems of two variable inequalities

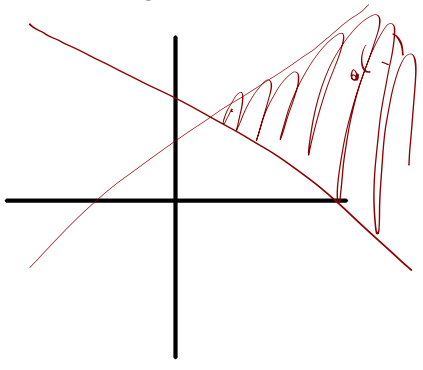
1. Solve single variable inequalities

$2x-1 \geq 7x^2-5$



2. Graph two variable inequalities

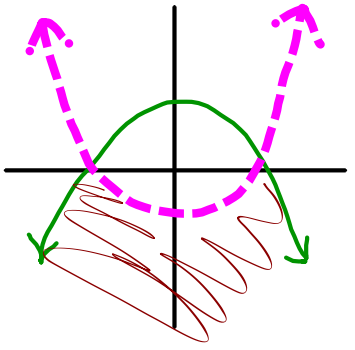
$x-2y > x+1$



3. Solve systems of two variable inequalities

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

$y < x^2+4x+3$



AIM

Solve

single variable inequalities

$2x-1<7$

SCHEDULE FOR TODAY:

HANDOUT → **THEN NOTES**

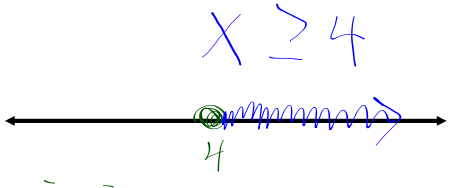
1 Use the ***boundary method*** to solve the one variable inequality $2x-1 \geq 7$ by doing the following:

a) Change the inequality into an equation to find the boundary point.

$2x-1=7$

$2x=8$

$x=4$



b) You should have found 4 to be the boundary point. Now choose a test point. (a number bigger or smaller than 4). Test your point in the original inequality. Then write the final solution of your inequality and represent it on the number line above.

TEST $x=3$

$2(3)-1 \geq 7$

$5 \geq 7$

false

→ solutions must be on the opposite side of 4

c) Now solve the original inequality **2x-1 ≥ 7** algebraically to verify above.

$2x \geq 8$

$x \geq 4$

the "direct" way doesn't always work with all types of functions so the test point method is necessary.

2 **Use the *boundary method to* solve the one variable quadratic inequality $x^2 - 2x < 0$ by:**

a) Change the inequality into an equation to find the boundary point(s).

$x^2 - 2x = 0$

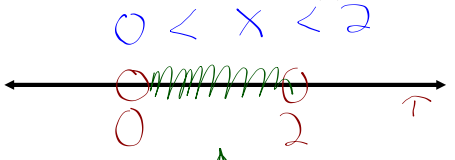
$x(x-2) = 0$

ZPP

$x = 0 \quad x - 2 = 0$

$x = 2$

0 and 2 are the boundary points



test $x = 7$

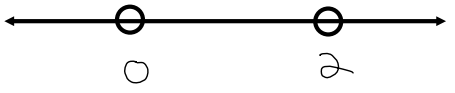
$7^2 - 2(7) < 0$

$49 - 14$

$35 < 0$

false ∴ solutions

b) Choose a test point between your two test points. (between 0 and 2)
Use your results to write the solution and shade the number line accordingly.



notes

Solve single variable inequalities
(1 Variable)

The solutions to single variable inequalities can always be shown on a number line.

notes Example 1

Solve

$x^2 - 3x - 10 \leq 0$

find boundary points

test

notes Example 1

Solve

$x^2-3x-10 \leq 0$

find boundary points

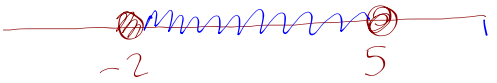
$x^2-3x-10=0$

$(x+2)(x-5)=0$

$x+2=0$ $\quad x=-2$

$x-5=0$ $\quad x=5$

$-2 \leq x \leq 5$



$6^2-3(6)-10 \leq 0$

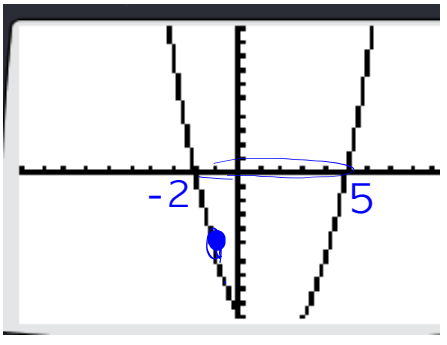
$36-18-10 \leq 0$

$8 \leq 0$

false

Graphing Check

$x^2-3x-10 \leq 0$



$-2 \leq x \leq 5$

EXAMPLE 2

consider the inequality $4|x+1|-2 > 6$

- Find boundary point(s) by changing it to an equation
- Then use a test point to help determine the solutions

Solve $4|x+1|-2 > 6$

find boundary points

$4|x+1|-2 = 6$

$4|x+1| = 8$

divide

$|x+1| = 2$

$x+1 = 2$ $\quad$ $x+1 = -2$

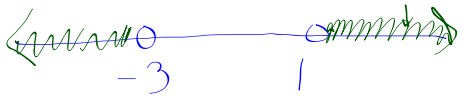
$-1 \quad -1 \quad\quad -1 \quad -1$

test

$x = 1 \quad x = -3$

are the boundary points

$x < -3$ OR $x > 1$



test $x = 2$

$4|2+1|-2 > 6$

$4|3|-2$

$12-2$

$10 > 6$

true

$4|x+1|-2 > 6$

$4|x+1| > 8$

$|x+1| > 2$

$x+1 > 2$ $\quad -1 \quad -1$ $\qquad x+1 < -2$ $\quad -1 \quad -1$

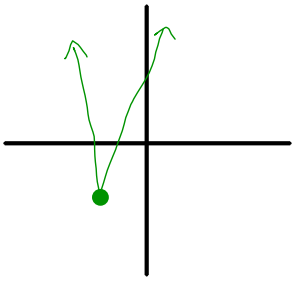
$x > \blacksquare$ or $x < -3$

Now Graphically (GDC) *to check*

$4|x+1|-2 > 6$

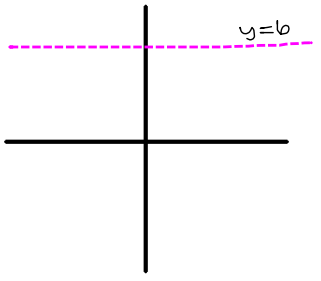
When are the y-values of

$4|x+1|-2$



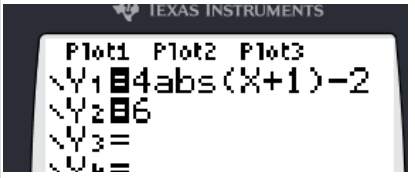
higher than the y-values of

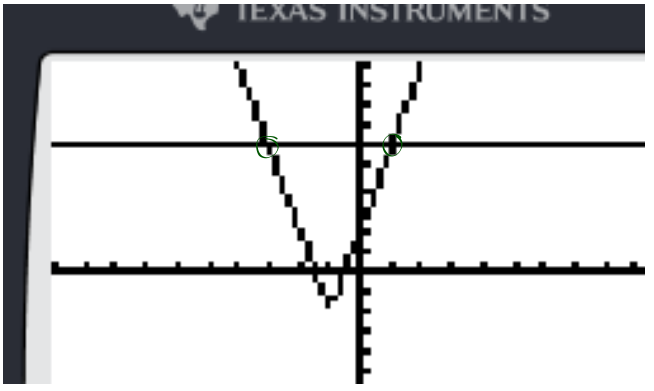
6



→

$4|x+1|-2 > 6$


TEXAS INSTRUMENTS
Plot1 Plot2 Plot3
Y1=4abs(X+1)-2
Y2=6
Y3=


TEXAS INSTRUMENTS


BREAK

Example 3

Solve $x^2-5>4x$

Boundary point(s)

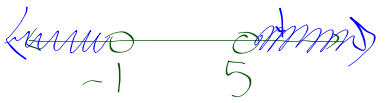
$x^2-5=4x$ it's quadratic baby!

$x^2-4x-5=0$

Factoring + ZPP | quadratic formula | completing the square

$x=-1 \quad x=5$

$x<-1$ or $x>5$



Test

test $x=6$

$6^2-5>4(6)$

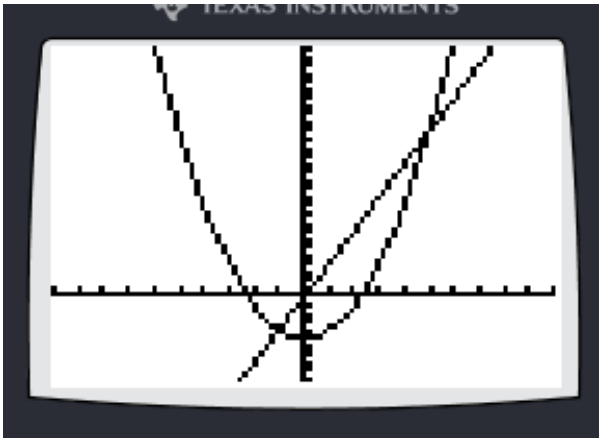
$36-5$

$31>24$ truth

Solution

Now graphically

$x^2-5>4x$



assignment

4. . . 65, 66ab, 67, 69bd, 70-71

Chapter 4 Test is next
Wednesday or Thursday, probably
Thursday