Some people call it Thursday,

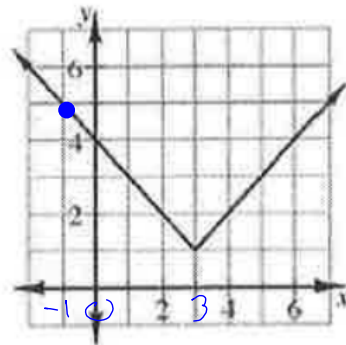I like to call it FRIDAY EVE!

reminder

Chapter 4 Test is on Wednesday

hello!

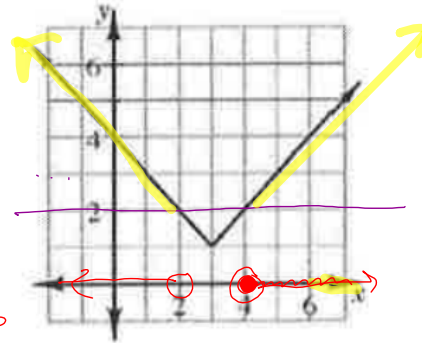Please pick up the 1/2 sheet for your warm up :)

hw tally

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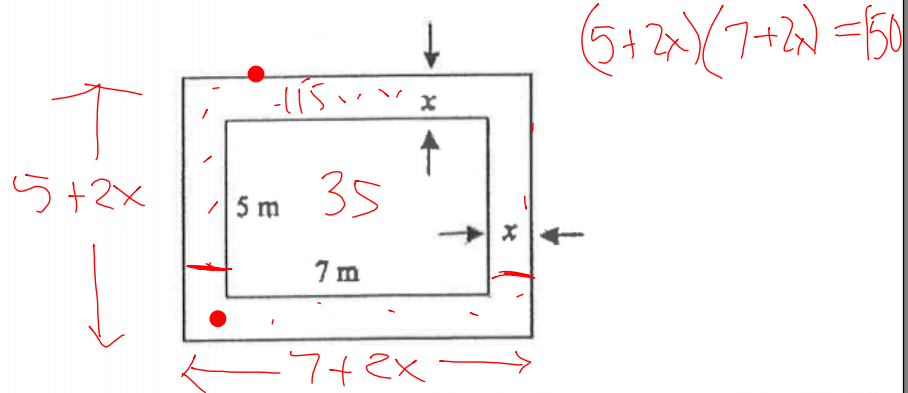to solve the equations and inequalities below.

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

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

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

d. $|x-3| + 1 > 2$ $X < 2 \text{ or } X > 4$

homework check

1. A rectangular pond 5 meters by 7 meters is going to be built. The builders want the pond to be surrounded by a walkway x meters wide.

$$(5+2x)(7+2x)=150$$

The area of the concrete walkway (not including the pond) is to be 115 m^2. Calculate the value of the width of the concrete to make this happen. show your process.

2. Abraham brags, *"My cell phone plan is the best! I pay just $25 per month, and then $.10 per minute."* Abbott quickly counters, *"Well my cell phone plan is even better! I only pay $20 per month and then $.12 per minute."* What do you think: who has the better cell phone plan? Explain completely.

52

check
$x = -1$

$2x^2 + 5x - 3 \overset{?}{=} x^2 + 4x + 3$

$2(-1)^2 + 5(-1) - 3 \overset{?}{=} (-1)^2 + 4(-1) + 3$

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

$$\sqrt[3]{(2x+1)^3} = \sqrt[3]{64}$$

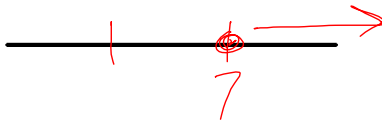$2x + 1 = 4$

The AIM
for the next few days...

1. Solve <u>single</u> variable inequalities

2. Graph <u>two variable</u> inequalities

3. Solve <u>systems</u> of two variable inequalities
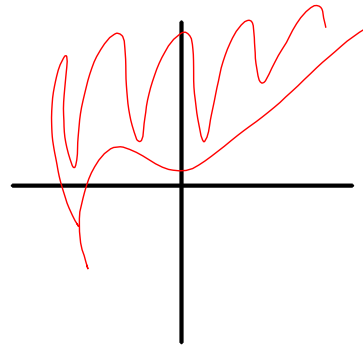
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1. Solve <u>single</u> variable inequalities

$$2x - 1 \geq 7$$

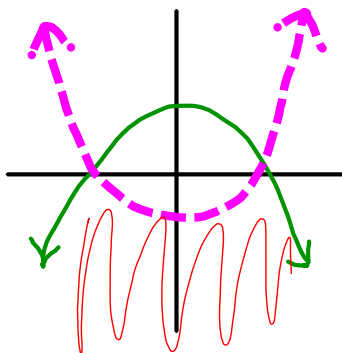**2.** Graph <u>two variable</u> inequalities

$$x - 2y > x + 1$$

3. Solve <u>systems</u> of two variable inequalities

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

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

BUT

$$\mathbb{A^IM}$$

For <u>today</u> we are focusing on:
single variable inequalities

SCHEDULE FOR TODAY:

HANDOUT

THEN NOTES

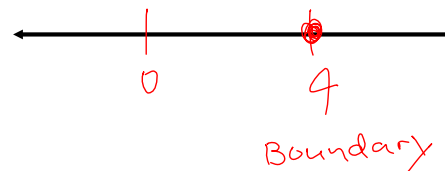1 Use the boundary method to solve the one variable inequality $2x-1 \geq 7$ by doing the following:

a) Change the inequality into an <u>equation</u> to find the boundary point.

$$2x - 1 = 7$$
$$+1 \ \ +1$$
$$\frac{2x}{2} = \frac{8}{2}$$
$$x = 4$$

0　　　4

Boundary

b) You should have found 4 to be the boundary point. Now choose a testpoint. (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.

$$2x - 1 \geq 7$$
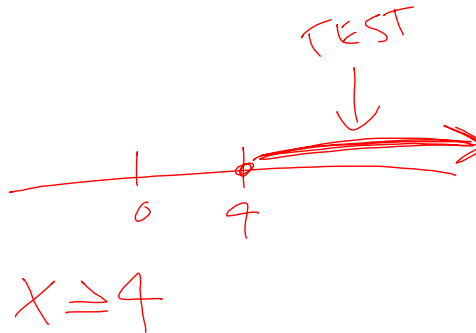$$2(7) - 1 \geq 7$$
$$14 - 1 \geq 7$$
$$13 \geq 7$$
TRUE

TEST

$$x \geq 4$$

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

$$2x - 1 \geq 7$$
$$ +1 \quad +1$$
$$\frac{2x}{2} \geq \frac{8}{2}$$
$$x \geq 4$$

the "direct" way doesn't always work with all types of functions so the test point method is useful
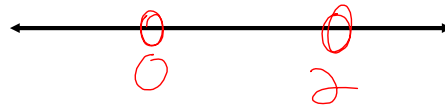
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2   **Use the** *boundary method to*   **solve the one variable quadratic inequality** $x^2 - 2x < 0$ **by:**

a) Change the inequality into an<u>equation</u> to find the boundary point(s).

$$x^2 - 2x = 0$$

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

$$x = 0 \qquad x - 2 = 0$$

$$x = 2$$

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.

TEST POINT $x=1$
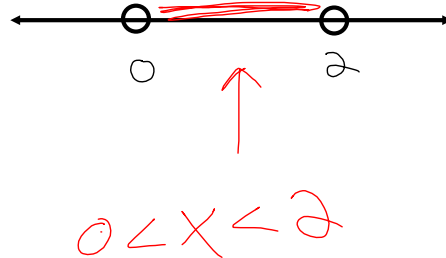
$x^2 - 2x \lessgtr 0$

$(1)^2 - 2(1) < 0$

$1 - 2 \leq 0$

$-1 < 0$ TRUE

$0 < x < 2$

notes

Solve <u>single</u> 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

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

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

test

$$x - 5 = 0 \qquad x + 2 = 0$$

$$\boxed{x = 5} \qquad \boxed{x = -2}$$

-2   5

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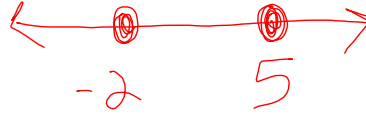
notes *Example 1*

Solve

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

find boundary points

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

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

$$x + 2 = 0 \qquad x + 5 = 0$$

$$x = -2 \qquad x = -5$$

test

TEST POINT

$x = 2$

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

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

$4 - 6 - 10 \leq 0$

$-2 - 10 \leq 0$

$-12 \leq 0$ TRUE

TEST PT

-2   5

BOUND.

Graphing Check

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

-2   5

$-2 \leq X \leq 5$

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

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

$$\frac{4|x+1|}{4} = \frac{8}{4}$$

$$|x+1| = 2$$

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

$$\boxed{x = 1} \qquad\qquad \boxed{x = -3}$$

test

TEST POINT

$x = -1$

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

$4|0| - 2 > 6$

$-2 > 6$ FALSE

TEST PT.

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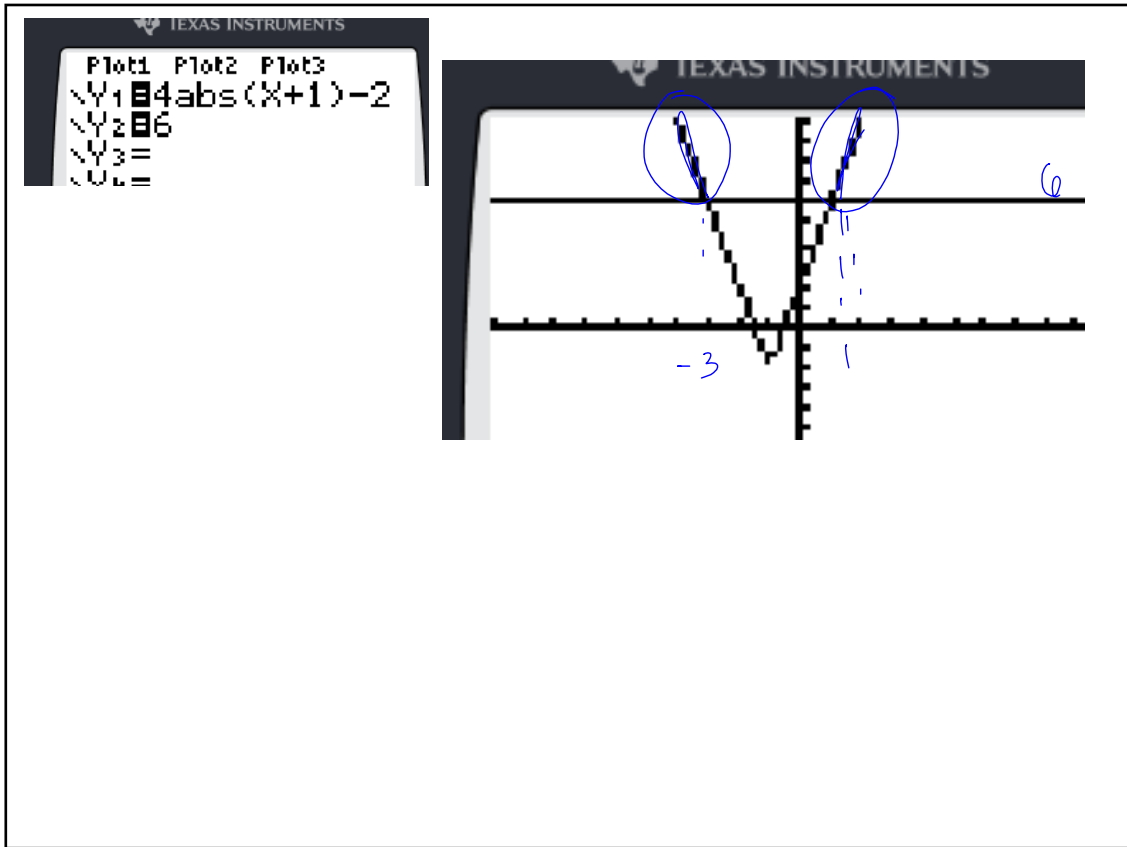
$x < -3$ OR $x > 1$

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

Now solve the whole inequality algebraically

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

$$\frac{4|x+1|}{4} > \frac{8}{4}$$

$$|x+1| > 2$$

$$x + 1 > 2 \qquad x > 1$$

$$x + 1 < -2 \qquad x < -3$$

Example 3

Solve $x^2 - 5 > 4x$ using the boundary point method

Boundary point(s)   Test

$x^2 - 5 > 4x$
$-4x \quad\ -4x$

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

Solution

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

$(x-5)(x+1) = 0$ $\longleftarrow \overset{\ominus}{-1} \quad \overset{\oplus}{5} \longrightarrow$ $x < -1 \text{ OR } x > 5$

$x - 5 = 0 \quad x + 1 = 0$
$x = 5 \quad\ x = -1$

Now graphically

$x^2 - 5 > 4x$

assignment

4- 65, 66ab, 67, 68a, 69ac, 70