

Name: _____

Date: _____

PC

Do Now:

1. Solve the following inequality and place the solution in interval notation:

$$x^3 - x^2 \leq x - 1$$

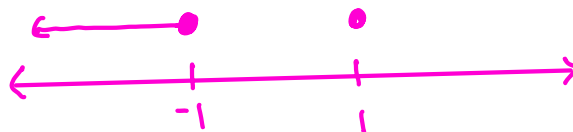
$$x^3 - x^2 - x + 1 \leq 0$$

$$x^2(x-1) - 1(x-1) \leq 0$$

$$(x^2-1)(x-1) \leq 0$$

$$(x+1)(x-1)(x-1) \leq 0$$

$$(x+1)(x-1)^2 \leq 0$$



test $x=0$

-

+

+

$$(-\infty, -1] \cup \{1\}$$

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PC: Solving Non-Linear Inequalities

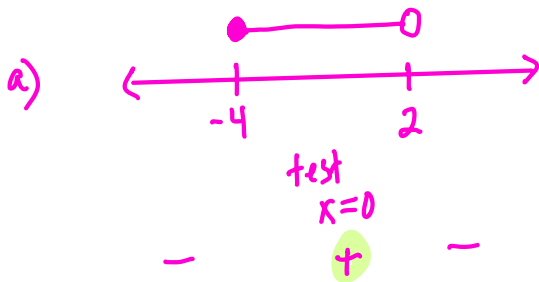
Ms. Loughran

For each inequality below, express its solution set 3 ways:

- (a) As a number line. *(graphically)*
- (b) Using set-builder notation.
- (c) Using interval notation.

** never a closed circle on a critical value that came from the denominator **

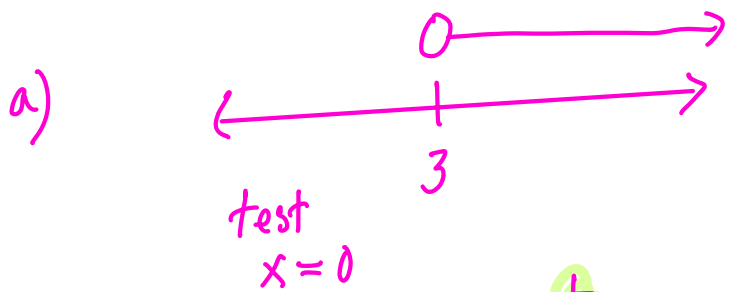
1. $\frac{x+4}{2-x} \geq 0$



b) $\{x \mid -4 \leq x < 2\}$

c) $[-4, 2)$

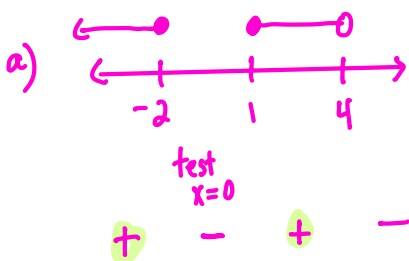
4. $\frac{6}{x-3} > 0$



b) $\{x \mid x > 3\}$

c) $(3, \infty)$

5. $\frac{(x+2)(x-1)}{4-x} \geq 0$



b) $\{x \mid x \leq -2 \text{ or } 1 \leq x < 4\}$

c) $(-\infty, -2] \cup [1, 4)$

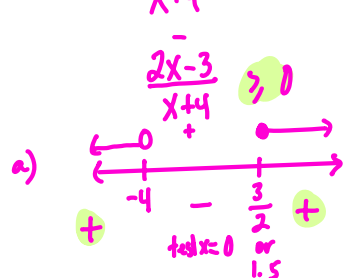
if you are using calculator to check
REPAIR $y =$
1: to get the fraction template

9. $\frac{3x+1}{x+4} \geq 1$

$\frac{3x+1}{x+4} - \frac{1(x+4)}{1(x+4)} \geq 0$

$\frac{3x+1-x-4}{x+4} \geq 0$

$\frac{2x-3}{x+4} \geq 0$



b) $\{x \mid x < -4 \text{ or } x \geq \frac{3}{2}\}$

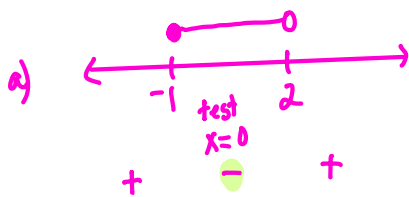
c) $(-\infty, -4) \cup [\frac{3}{2}, \infty)$

$$11. \frac{3}{x-2} \leq -1$$

$$\frac{3}{x-2} + \frac{x-2}{x-2} \leq 0$$

$$\frac{3+x-2}{x-2} \leq 0$$

$$\frac{x+1}{x-2} \leq 0$$

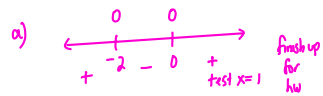


b) $\{x \mid -1 \leq x < 2\}$

c) $[-1, 2)$

$$2. \frac{x}{x+2} < 0$$

$x=0$
 $x+2=0$
 $x=-2$



Homework 09-15

(15) $3k^2 + 24k > -36$

$$3k^2 + 24k + 36 > 0$$

$$3(k^2 + 8k + 12) > 0$$

$$3(k+6)(k+2) > 0$$



+ - +

$$\{k \mid k < -6 \vee k > -2\}$$

$$(-\infty, -6) \cup (-2, \infty)$$

(17) $u + 20 > u^2$

$$-u^2 + u + 20 > 0$$

$$u^2 - u - 20 \leq 0$$

$$(u-5)(u+4) \leq 0$$

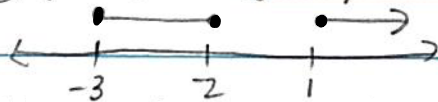


+ - +

$$\{u \mid -4 \leq u \leq 5\}$$

$$[-4, 5]$$

(19) $(x+3)(x+2)(x-1) \geq 0$

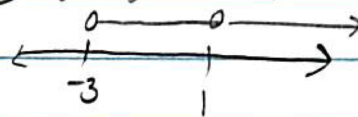


- + - +

$$\{x \mid -3 \leq x \leq -2 \vee x \geq 1\}$$

$$[-3, -2] \cup [1, \infty)$$

(21) $(x-1)^2(x+3) > 0$



x+3 - + +

$$\{x \mid -3 < x < 1 \vee x > 1\}$$

$$(-3, 1) \cup (1, \infty)$$

(23) $5x^3 \leq 5x$

$$5x^3 - 5x \leq 0$$

$$5x(x^2 - 1) \leq 0$$

$$5x(x+1)(x-1) \leq 0$$



- + - +

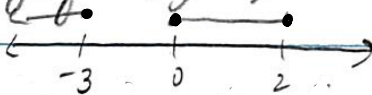
$$\{x \mid x \leq -1 \vee 0 \leq x \leq 1\}$$

$$(-\infty, -1] \cup [0, 1]$$

(24) $y^3 + y^2 - 6y \leq 0$

$$y(y^2 + y - 6) \leq 0$$

$$y(y+3)(y-2) \leq 0$$



- + - +

$$\{y \mid y \leq -3 \vee 0 \leq y \leq 2\}$$

$$(-\infty, -3] \cup [0, 2]$$