

Do Now: # 17 from yesterday's sheet

17. $\frac{2}{x(x-1)} < 1 + \frac{2}{x-1}$

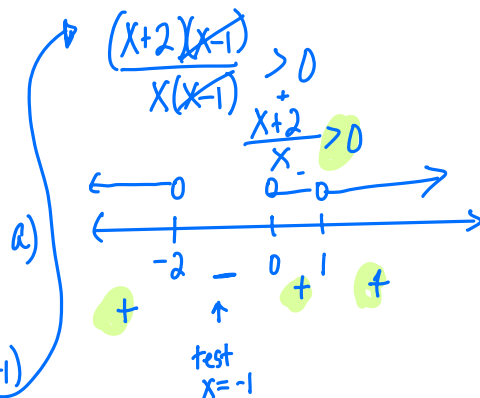
$$\frac{2}{x(x-1)} + \frac{-1 \cdot x(x-1)}{x(x-1)} + \frac{-2(x)}{x(x-1)} < 0$$

$$\frac{2 - x^2 + x - 2x}{x(x-1)} < 0$$

$$\frac{-(x^2 + x - 2)}{x(x-1)} < 0$$

$$\frac{-x^2 - x + 2}{x(x-1)} < 0$$

$$\frac{(-1) \cdot (x+2)(x-1)}{x(x-1)} < 0 \quad (-1)$$

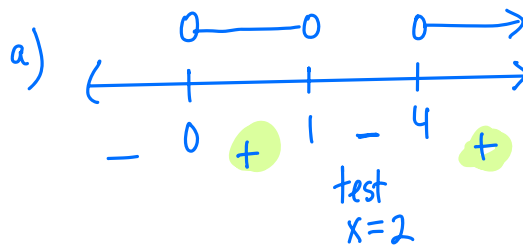


b) $\{x \mid x < -2 \vee 0 < x < 1 \vee x > 1\}$

c) $(-\infty, -2)$ or $(0, 1)$ or $(1, \infty)$

7. $\frac{x^2 - 5x + 4}{x} > 0$

$$\frac{(x-1)(x-4)}{x} > 0$$



b) $\{x \mid 0 < x < 1 \text{ or } x > 4\}$

c) $(0, 1)$ or $(4, \infty)$

18. $4 + \frac{1}{x} \geq \frac{10}{2x}$

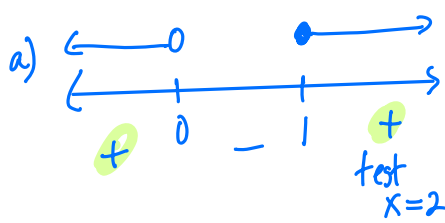
(2x) $\frac{4}{1} + \frac{1(2)}{x(2)} - \frac{10}{2x} \geq 0$

$\frac{8x + 2 - 10}{2x} \geq 0$

$\frac{8x - 8}{2x} \geq 0$

$\frac{4(2x - 2)}{2x} \geq 0$

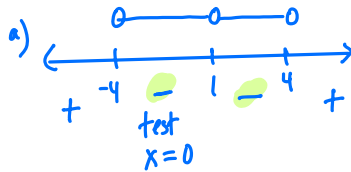
$\frac{4(x-1)}{x} \geq 0$



- b) $\{x \mid x < 0 \text{ or } x > 1\}$
- c) $(-\infty, 0) \text{ or } [1, \infty)$

8. $\frac{x^2 - 16}{(x-1)^2} < 0$

$\frac{(x+4)(x-4)}{(x-1)^2} < 0$



- b) $\{x \mid -4 < x < 1 \text{ or } 1 < x < 4\}$
- c) $(-4, 1) \text{ or } (1, 4)$

19. $x - \frac{10}{x-1} \geq 4$

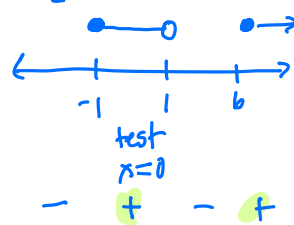
$\frac{(x-1)x - 10}{(x-1)} - \frac{4(x-1)}{1(x-1)} \geq 0$

$\frac{x^2 - x - 10 - 4x + 4}{x-1} \geq 0$

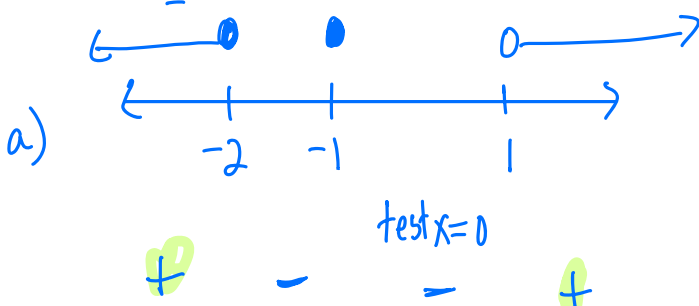
$\frac{x^2 - 5x - 6}{x-1} \geq 0$

$\frac{(x-6)(x+1)}{x-1} \geq 0$

- c) $(-\infty, -2] \text{ or } (1, \infty) \text{ or } \{-1\}$



20. $\frac{(x+1)^2(x+2)}{x-1} \geq 0$



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

b) $\{x \mid -1 \leq x < 1 \text{ or } x > 6\}$
c) $[-1, 1) \text{ or } [6, \infty)$

Name: _____

Date: _____

PC: Solving Non-Linear Inequalities

Ms. Loughran

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

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

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

12. $\frac{3x+1}{x-1} \geq 2$

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

13. $\frac{4}{x+2} > 2$

3. $\frac{x+5}{x-1} > 0$

14. $\frac{1}{4} < \frac{7}{7-x}$

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

15. $\frac{x+2}{x-6} \geq -3$

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

16. $\frac{x-8}{x+6} \leq 2$

6. $\frac{(6-x)(3+x)}{x+1} \leq 0$

17. $\frac{2}{x(x-1)} < 1 + \frac{2}{x-1}$

7. $\frac{x^2-5x+4}{x} > 0$

18. $4 + \frac{1}{x} \geq \frac{10}{2x}$

8. $\frac{x^2-16}{(x-1)^2} < 0$

19. $x - \frac{10}{x-1} \geq 4$

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

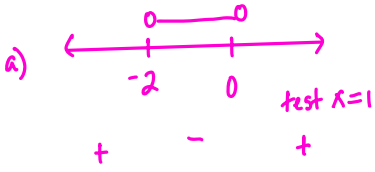
20. $\frac{(x+1)^2(x+2)}{x-1} \geq 0$

10. $\frac{x-8}{x} + x - 3 \leq 0$

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

Homework 09-18

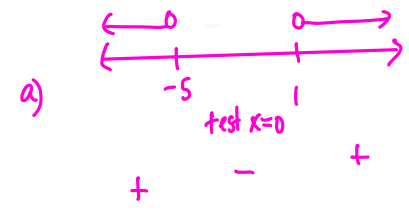
2. $\frac{x}{x+2} < 0$



b) $\{x | -2 < x < 0\}$

c) $(-2, 0)$

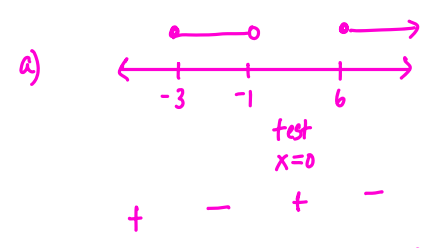
3. $\frac{x+5}{x-1} > 0$



b) $\{x | x < -5 \vee x > 1\}$

c) $(-\infty, -5) \cup (1, \infty)$

6. $\frac{(6-x)(3+x)}{x+1} \leq 0$

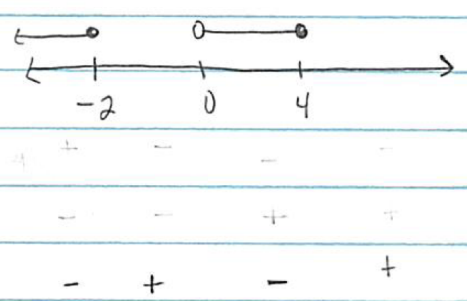


b) $\{x | -3 \leq x < -1 \vee x \geq 6\}$

c) $[-3, -1) \cup [6, \infty)$

10) $\frac{x-8}{x} + \frac{x-3}{1} \leq 0$

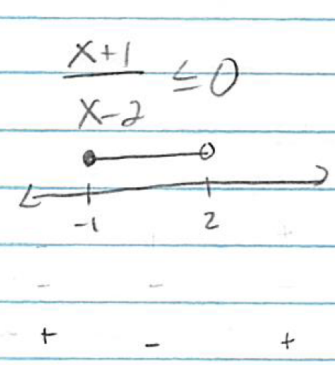
$\frac{x-8}{x} + \frac{x(x-3)}{x(x-4)(x+2)} \leq 0$
 $\frac{x^2-2x-8}{x} \leq 0$



$\{x | x \leq -2 \vee 0 < x \leq 4\}$
 $(-\infty, -2] \cup (0, 4]$

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

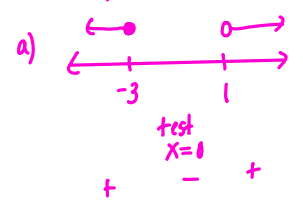
$\frac{3}{x-2} + 1 \leq 0$
 $\frac{3+x-2}{x-2} \leq 0$



$\{x | -1 \leq x < 2\}$
 $[-1, 2)$

12. $\frac{3x+1}{x-1} \geq 2$

$\frac{3x+1}{x-1} - 2 \geq 0$
 $\frac{3x+1-2(x-1)}{x-1} \geq 0$
 $\frac{x+3}{x-1} \geq 0$



b) $\{x | x \leq -3 \vee x > 1\}$

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