9/21/ Precalc Quiz 8

1. $4x^2 - 10 = 0$

$4x^2 = 10$ $\quad x^2 = \frac{10}{4} \Rightarrow \frac{5}{2}$

$x = \pm\sqrt{\frac{5}{2}}$

2. $x^2 - 5x - 6 = 0$

$(x-6)(x+1) = 0$

$x = 6, -1$

3. $x^2 + 4x - 2 = 0$

$x^2 + 4x = 2$

$x^2 + 4x + \frac{4}{} = 2 + 4 = 6$

$\left(\frac{4}{2}\right)^2 =$

$(x+2)^2 = 6$

$(x+2) = \pm\sqrt{6}$

$x = -2 \pm \sqrt{6}$

$= 2 - \sqrt{6}$

$-2 + \sqrt{6}$

4. $5x^2 - 3x - 2 = 0$

$a = 5,\ b = -3,\ c = -2$

Quad fun: $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$\frac{+3 \pm \sqrt{(-3)^2 - 4(5)(-2)}}{2 \cdot 5} =$$

$$\frac{3 \pm \sqrt{9 + 40}}{10} =$$

$\dfrac{3 \pm 7}{10}$ $\quad 1, -\dfrac{4}{10}$

Exam 1 → Sept. 29
Review sheet

Last time: 1.7 linear inequalities

① add / subtract some quantity from both sides of inequality

② multiply/divide by positive numbers

③ multiply/divide by negative, need to reverse inequality

Ex 1 Ca) $3x - 7 < x + 19$

$3x < x + 26$ +7

$2x \leq 26$ $\quad -x$

$\div 2$

$x \leq \frac{26}{2} = 13$

$x \leq 13 \qquad (-\infty, 13)$

(b) $2 < \frac{-5x+10}{8} < 10$ $\quad \times 8$

$16 < -5x+10 < 80$ $\quad -10$

$6 < -5x < 70$

$-\frac{6}{5} > x > -\frac{70}{5} = -14$

$(-14, -6/5)$

Absolute values

Ex2 (a) $|x| > -2$ Always

$(-\infty, \infty)$

(b) $|x| < -2$ NEVER

NO SOLUTION (or $\emptyset$)

empty set

(c) $|x| < 2$ unclear:

$$|x| = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$$

So $|x| < 2 \iff -2 < x < 2$

$x < 0$,

$-x < 2$

$x > -2$

In general:

① $|x| < a \iff -a < x < a$

② $|x| > a \iff \boxed{x < -a \text{ or } x > a}$

Ex 3 (a) $|2x-5| \leq 4$

$-4 \leq 2x-5 \leq 4 \quad +5$

$1 \leq 2x \leq 9 \quad \div 2$

$\frac{1}{2} \leq x \leq 9/2$

$[1/2, 9/2]$

(b) $|7-3x| > 3$

$7-3x < -3$ OR $7-3x > 3$

$-3x < -10$ | $-3x > -4$

$-x < -10/3$ | $x < +4/3$

$x > 10/3$ | OR

union

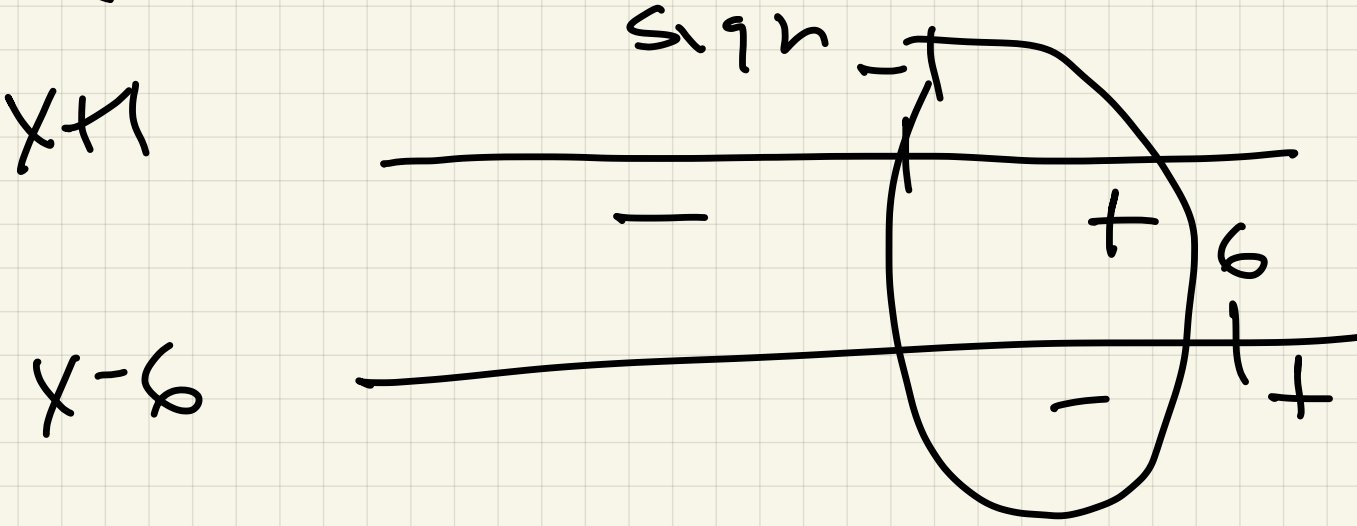
$(-\infty, 4/3) \cup (10/3, \infty)$

1.8 Other inequalities

Ex1: $x^2 - 5x - 6 < 0$

$a=1 \quad b=-5 \quad c=-6$

$(x-6)(x+1) < 0$

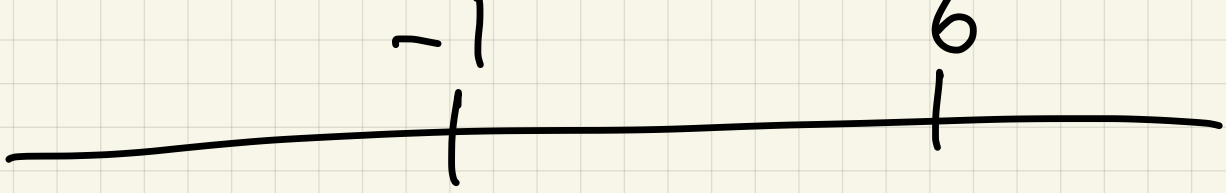


Get $-1 < x < 6$

$(-1, 6)$

Not efficient!

BETTER Set $x^2 - 5x - 6 = 0$



try test intervals to check > 0 or < 0

Ex 2 (a) $x^5 - 5x^3 \geq 0$

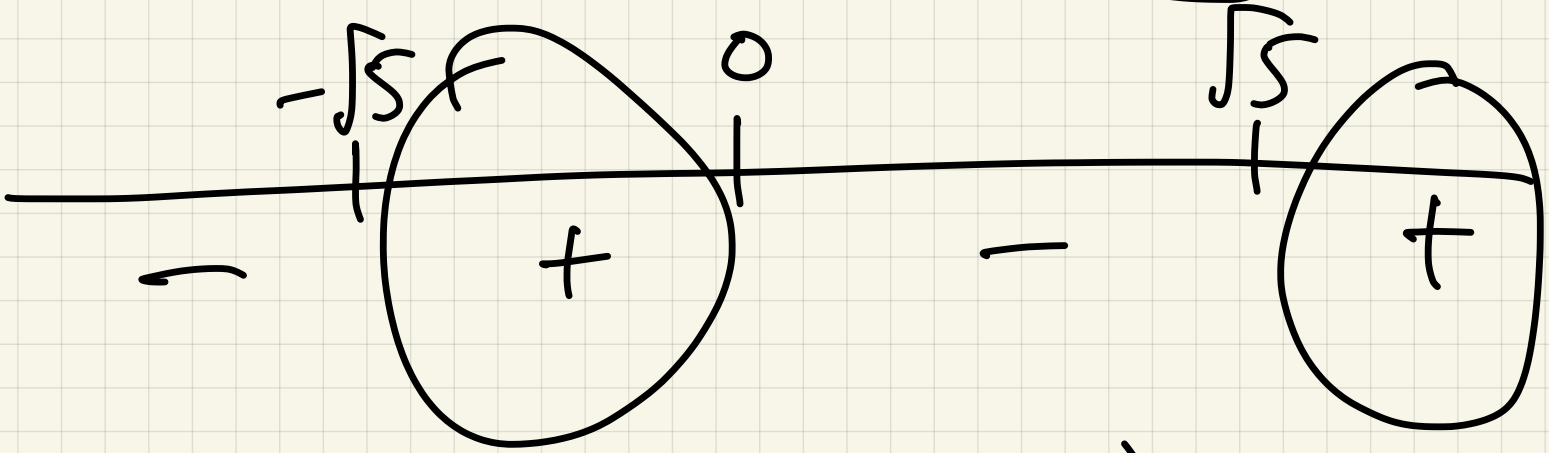
① $x^3(x^2 - 5) = 0$

$x^3 = 0 \Rightarrow x = 0$

$x^2 - 5 = 0$

$x^2 = 5$

$x = \pm\sqrt{5}$

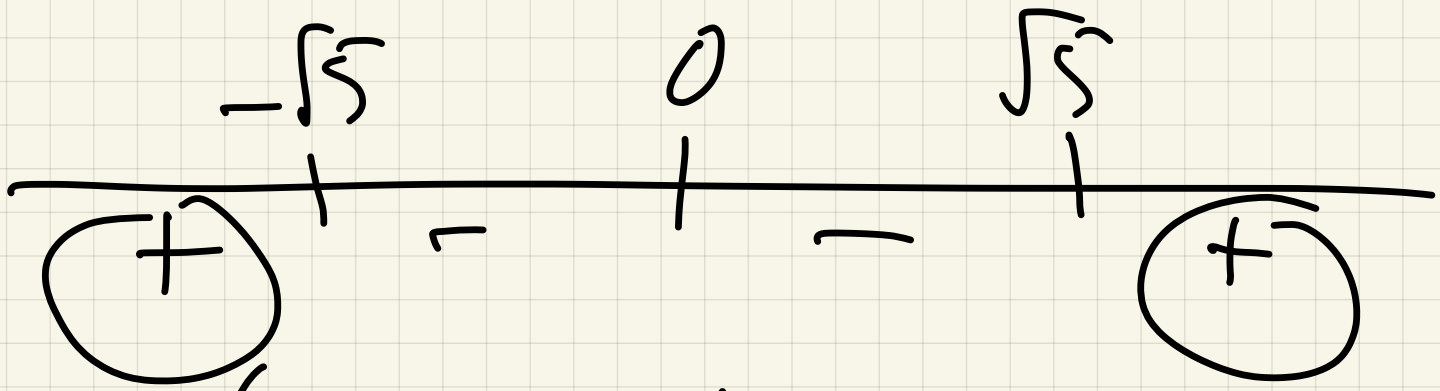


$(-\sqrt{5}, 0) \cup (\sqrt{5}, \infty)$

(b) $x^4 - 5x^2 > 0$

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

$x = 0, \pm\sqrt{5}$



$(-\infty, -\sqrt{5}) \cup (\sqrt{5}, \infty)$