2/7 [2.7 Quadratic Inequalities]

Ex1: $4m^3+5m^2-2m+5 \geq -2m^2+5$

$+2m^2 \quad -5 \quad +2m^2 \quad -5$

$4m^3+7m^2-2m \geq 0$

$m(4m^2+7m-2) \geq 0$

$m(4m-1)(m+2) \geq 0$ *

$m=0 \quad 4m-1=0 \quad m+2=0$

$m=\frac{1}{4} \quad m=-2$ CV

		−2		0		$\frac{1}{4}$	
m	−		−		+		+
$4m-1$	−		−		−		+
$m+2$	−		+		+		+

$[-2, 0] \cup [\frac{1}{4}, \infty)$

Ex2: $3x^3+2x-20<2x+4$

$-2x \quad -4 \quad -2x \quad -4$

$3x^3-24<0$ ← neg

$3(x^3-8)<0$

$3(x-2)(x^2+2x+4)<0$

$3\neq 0$; $x=2$; $x^2+2x+4=0$

$a=1 \quad b=2 \quad c=4$

$$x=\frac{-2\pm\sqrt{(2)^2-4(1)(4)}}{2(1)}$$

$$x=\frac{-2\pm\sqrt{-12}}{2}$$

$$x=\frac{-2\pm 2i\sqrt{3}}{2} \quad \text{non real c.v}$$

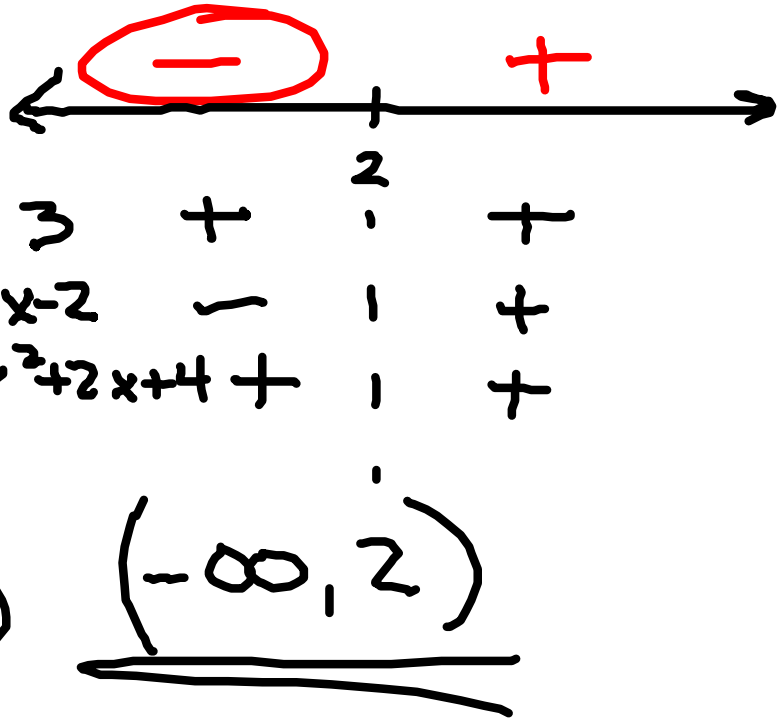
$x=-1\pm i\sqrt{3} \Rightarrow -1+i\sqrt{3}, -1-i\sqrt{3}$

C.V

$x=2$ ✓

~~$x=-1+i\sqrt{3}$~~

~~$x=-1-i\sqrt{3}$~~



$(-\infty, 2)$

Ex3: $5x^2 - 7x + 1 \leq x^2$

$-x^2 \quad -x^2$

$\Rightarrow 4x^2 - 7x + 1 \leq 0$

$x = \dfrac{7 \pm \sqrt{(-7)^2 - 4(4)(1)}}{2(4)}$

$x = \dfrac{7 \pm \sqrt{49 - 16}}{8}$

$x = \dfrac{7+\sqrt{33}}{8}, \dfrac{7-\sqrt{33}}{8}$ ≤ ✓

$\left[\dfrac{7-\sqrt{33}}{8}, \dfrac{7+\sqrt{33}}{8}\right]$

-4 $\quad \dfrac{7-\sqrt{33}}{8} \approx .16 \quad$ 1 $\quad \dfrac{7+\sqrt{33}}{8} \approx 1.59 \quad$ 5

$4(-4)^2 - 7(-4) + 1 \leq 0$

$93 \leq 0$ F

$4(1)^2 - 7(1) + 1 \leq 0$

$-2 \leq 0$ T

$4(5)^2 - 7(5) + 1 \leq 0$

$66 \leq 0$ F

HW pg 146-147 27-42,55-59 all