§1.5 (continued)

Jan 21, 2011
Sec 22

53. pg 71

$$\text{Concentration} = \frac{\text{amt of pure substance}}{\text{total amt of mixture.}}$$

$$0.75 = \frac{\text{amount of gold}}{\text{amount of metal.}}$$

$$0.75 = \frac{\overbrace{5\,(0.9 \cdot 18)}^{\text{each ring}} + \overbrace{0}^{\text{silver gives no more gold}}}{5(18) + \underbrace{S}_{\text{added silver mass}}}$$

$$\frac{3}{4} = \frac{81}{90+S}$$

$$\frac{4}{3}\left(\frac{3}{4}(90+S)\right) = (81)\,4/3$$

$$90+S = 108$$

$$\boxed{S = 18\text{g}}$$

61.) p 71 let K = karen's time to paint one house

6 = Betty's time to paint one house

$\frac{2}{3}K$ = time takes to paint one house together

$\Rightarrow$ In one hour;

Betty paints $1/6$ of house.

Karen paints $1/K$ of house

together painted $1/\frac{2}{3}K$ of house $\leftarrow$

$\Rightarrow$ In one hour together : $6K\left(\frac{1}{6}+\frac{1}{K}\right) = \left(\frac{3}{2K}\right)6K$

$$K + 6 = 9$$

$$\boxed{K = 3 \text{ hours}}$$

See Ex 7 in text for another example using the same method.

§1.7 Inequalities

Use same techniques as in solving equations;
only have to watch for direction of inequality.
mult/divide by neg ⇒ flips inequality.

↳ Why? Easy example

$$1 < 2$$

$$-1 > -2$$

Linear Inequalities:

0.) $-7 - 3x \geq 10$

$$-3x \geq 3$$

$$\boxed{x \leq -1}$$

1.) $6\left(\frac{1}{3}x + 2\right) < \left(\frac{1}{6}x - 1\right)6$

$$2x + 12 < x - 6$$
$$-x \quad -12 \quad -x \quad -12$$

$$\boxed{x < -18}$$

Non-linear Inequalities

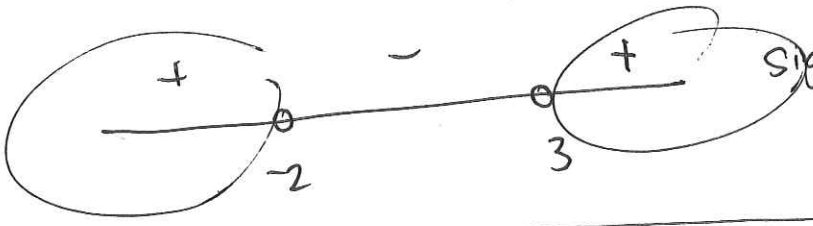
2.) $(x+2)(x-3) > 0$

★ Note: both factors are neg or both factors are positive.

Sign diagram

sign of $x+2$ → zero of $x+2$: $x+2=0$, $x=-2$

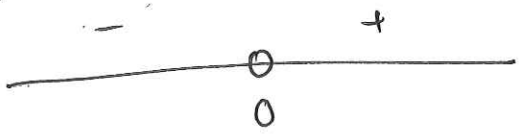
sign of $x-3$



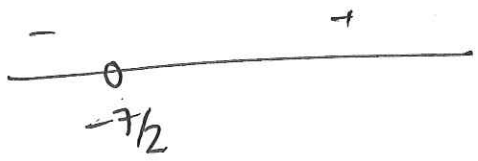
sign of $(x+2)(x-3)$

$$(-\infty, -2) \cup (3, \infty)$$

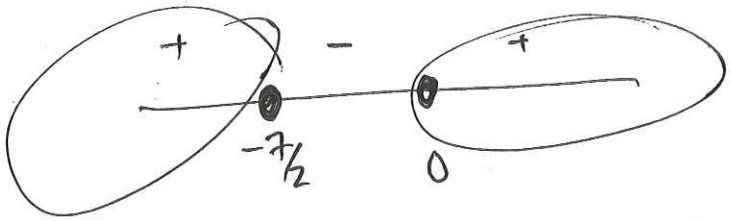
3.) $x(2x+7) \geq 0$ ← posi, or equal 0



sign of x



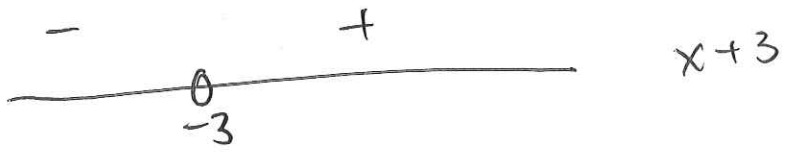
sign of $2x+7$

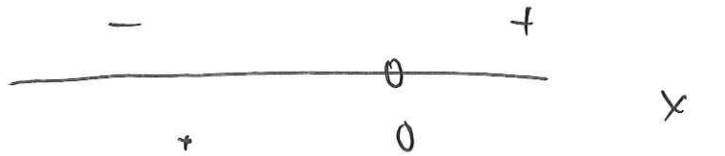


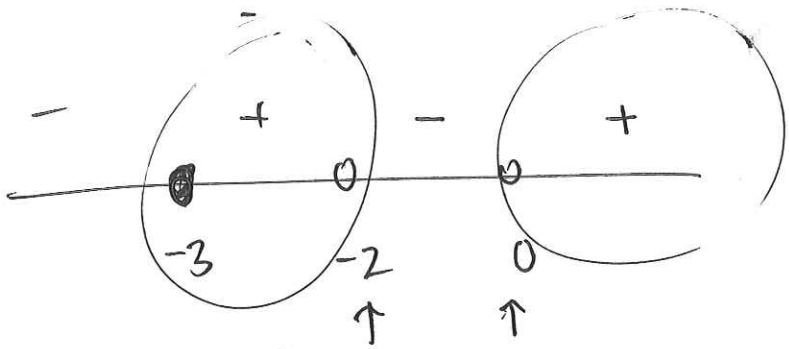
sign of $x(2x+7)$

$$(-\infty, -7/2] \cup [0, \infty)$$

4.) $\frac{x+3}{(x+2)(x)} \geq 0$







final fraction

$\frac{x+3}{(x+2)(x)}$

not in domain
(denom would be zero)

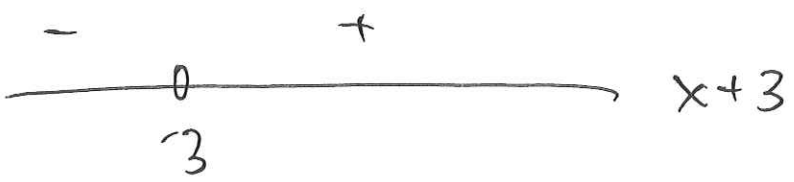
$\Rightarrow [-3, -2) \cup (0, \infty)$

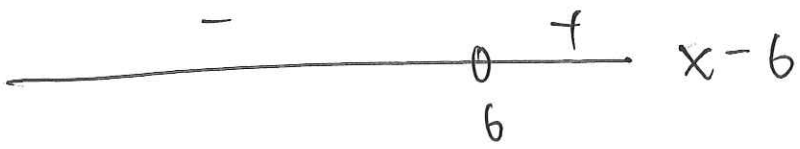
5.) $x^2 > 3(x+6)$

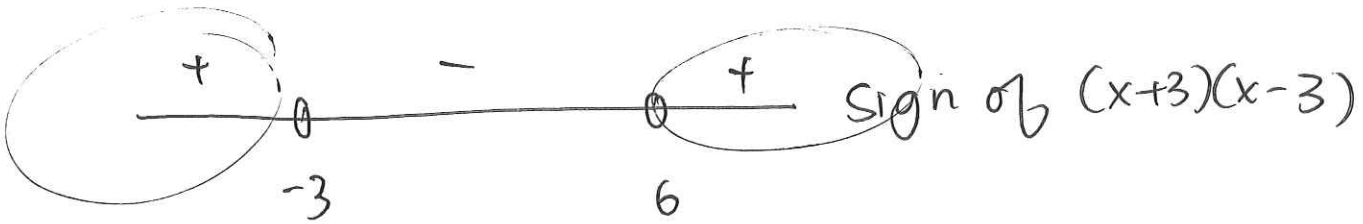
$3x + 18$

$x^2 - 3x - 18 > 0$

$(x+3)(x-6) > 0$ ← positive!







$(-\infty, -3) \cup (6, \infty)$

In general: To solve non-linear guys.

1.) move all terms to one side
(makes one side 0)

2.) Factor

3.) Sign Diagram

4.) Identify the appropriate sign / endpoints.

Quiz Weds on 1.7.

95, 97 + all examples from today.