MTH-PC College Algebra 10/6 Session 9

$x^2 + 9x - 36 \geq 0$ **positive**

$12 * -3 = -36$ ↓

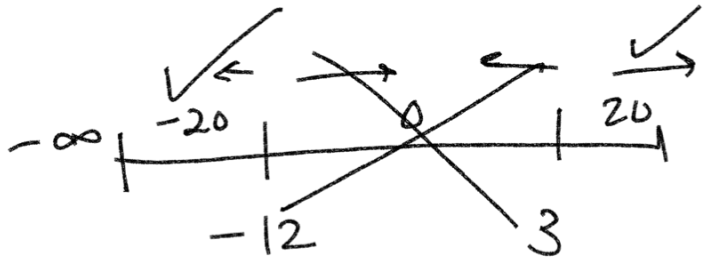
$12 + -3 = 9$

36	1
18	2
12	3

$(x+12)(x-3) \geq 0$ []

$x + 12 = 0$
$-12 \quad -12$
$x = -12$

$x - 3 = 0$
$+3 \quad +3$
$x = 3$

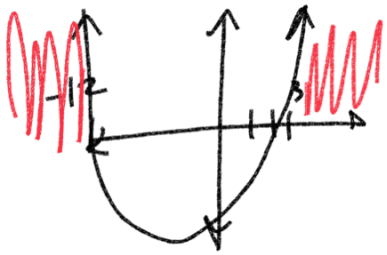


$(-\infty, -12] \cup [3, \infty)$

-20: $(x+12)(x-3)$
$\quad -20 \quad -20$
$\quad \ominus * \ominus = \oplus$

0: $(x+12)(x-3)$
$\quad 0 \quad 0$
$\quad \oplus * \ominus = \ominus$

20: $(x+12)(x-3)$
$\quad 20 \quad 20$
$\quad \oplus * \oplus = \oplus$



Interval Notation

$x < 2$

$(-\infty, 2)$

$-8 < x \leq 5$

( ]

$(-8, 5]$

Interval Notation

$x^2 + 10x + 24 \leq 0$

$\_\_ * \_\_ = 24$

$\_\_ + \_\_ = 10$

$(x+6)(x+4) \leq 0$

$x+6=0 \quad x+4=0$

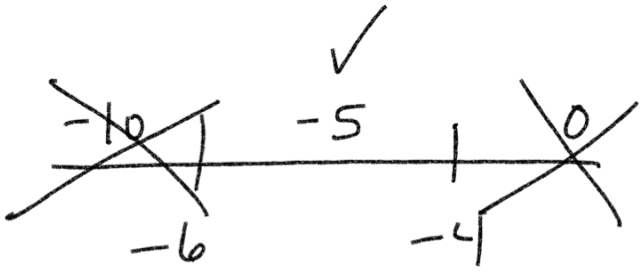
$-6 \ -6 \quad -4 \ -4$

$x=-6 \quad x=-4$

$[-6, -4]$

Pos / Neg?

Negative



$(x+6)(x+4)$

$-10: (-10+6)(-10+4) = (+)$

$- * - = +$

$-5: (-5+6)(-5+4) = (-)$

$+ * - = -$

$0: (0+6)(0+4) = (+)$

$+ * + = +$

Positive

$2x^2 - 5x - 7 \geq 0$

$(2x-7)(x+1) = 0$

$2x-7=0 \quad x+1=0$

$+7 \ +7 \quad -1 \ -1$

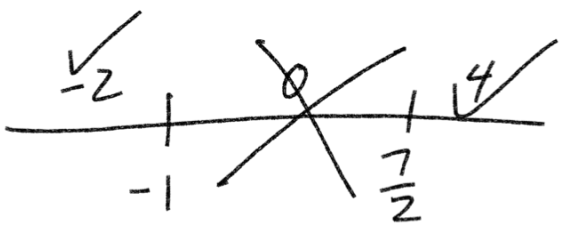
$2x = 7 \quad x = -1$

$\frac{2x}{2} = \frac{7}{2}$

$x = \frac{7}{2}$

$\frac{5+9}{4} \quad \frac{5-9}{4}$

$\frac{14}{4} = \frac{7}{2} \quad \frac{-4}{4} = -1$



$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$\frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-7)}}{2(2)}$

$\frac{5 \pm \sqrt{25+56}}{4}$

$\frac{5 \pm \sqrt{81}}{4} = \frac{5 \pm 9}{4}$

$-2: 2(-2)^2 - 5(-2) - 7$ $\quad 2x^2 - 5x - 7$ Positive

$2(4) + 10 - 7$

$8 + 10 - 7 \quad 18 - 7 = +$

$0 \quad 2(0)^2 - 5(0) - 7 = -7 = -$

$(-\infty, -1] \cup [\frac{7}{2}, \infty)$

$4 \quad 2(4)^2 - 5(4) - 7$

$32 - 20 - 7$

$12 - 7 = 5$ +

$$\frac{2x-179}{5x-25} \leq 3 \qquad \frac{2x-179}{5x-25} - 3 \leq 0$$

$-3 \quad -3$

$$\frac{2x-179}{5x-25} - \frac{3(5x-25)}{5x-25} \leq 0$$

$$\frac{2x-179-15x+75}{5x-25} \leq 0$$

$$\frac{-13x-104}{5x-25} \leq 0$$

Negative

Find parameters

$\frac{+}{+} \quad \frac{-}{+} \quad \frac{+}{-} \quad \frac{-}{-}$

$- \; | \; +$

0

$-13x - 104 = 0$

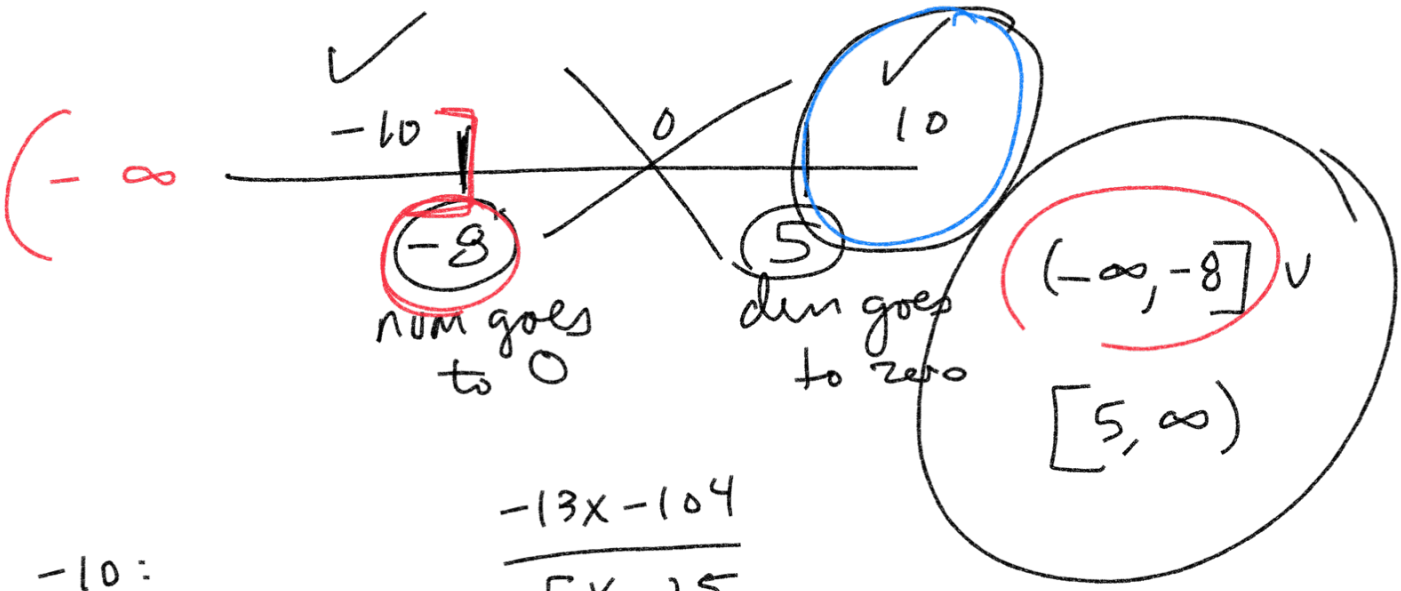
$+104 \quad +104$

$\frac{-13x}{-13} = \frac{104}{-13}$ $\quad x = -8$

$5x - 25 = 0$

$+25 \quad +25$ $\quad x = 5$

$\frac{5x}{5} = \frac{25}{5}$



$$\frac{-13x-104}{5x-25}$$

-10:

$-13(-10)-104 =$

$130-104 = +$

$5(-10)-25 = -$

$-50-25$

$\frac{+}{-} = -$

0: $-13(0)-104 = -$

$5(0)-25 = -$

$\frac{-}{-} = +$

10: $-13(10)-104 = -$

$-130-104$

$5(10)-25 = +$

$\frac{-}{+} = -$

1st: isolate absolute value

$$|x+7| - 3 < 6$$
$$+3 \quad +3$$

$$|x+7| < 9$$

flip inequality and change the sign

$$x+7 < 9$$
$$-7 \quad -7$$
$$x < 2$$

$$x+7 > -9$$
$$-7 \quad -7$$
$$x > -16$$

$(-16, 2)$

$$|x+7| + 8 < 3$$
$$-8 \quad -8$$
$$|x+7| < -5$$

no solution

$$|x+7| - 9 > -12$$
$$+9 \quad +9$$
$$|x+7| > -3$$

all solutions, all real numbers $\mathbb{R}$

$(-\infty, \infty)$