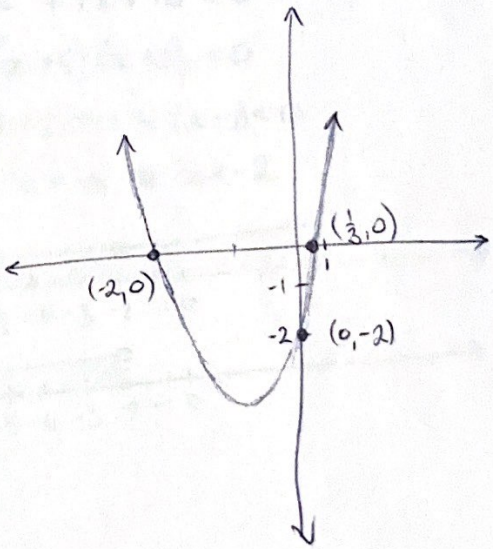
(32)

$f(x) = 3x^2 + 5x - 2$

1. $f(0) = 3(0)^2 + 5(0) - 2$

$= -2$ ← y-intercept

$(0, -2)$



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

$(3x - 1)(x + 2)$

$0 = 3x - 1$ $\quad$ $0 = x + 2$

$1 = 3x$ $\quad$ $x = -2$

$x = \frac{1}{3}$

↖ x-intercepts ↗

$(\frac{1}{3}, 0)$ and $(-2, 0)$

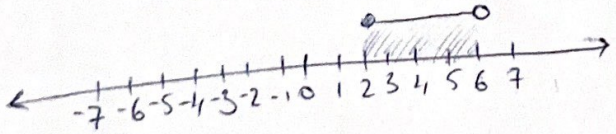
a. $-1 \leq 2x - 5 < 7$

$-1 + 5 \leq 2x - 5 + 5 < 7 + 5$

$4 \leq 2x < 12$

$2 \leq x < 6$

$[2, 6)$

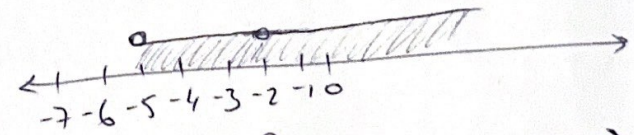


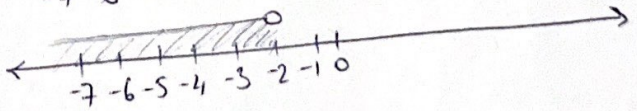
b. $x^2 + 7x + 10 < 0$

$(x+5)(x+2) < 0$

$(x+5) > 0 \cup (x+2) < 0$

$x > -5 \cup x < -2$

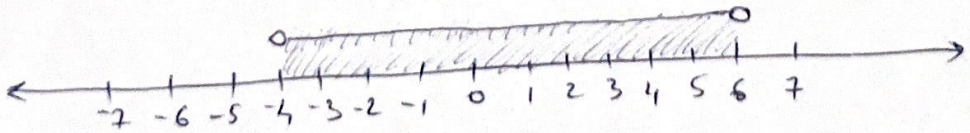




c. $-6 < x - 2 < 4$

$-6 + 2 < x - 2 + 2 < 4 + 2$

$-4 < x < 6 \Rightarrow (-4, 6)$



(34)

$$10-(2y+1) \leq -4(3y+2)-3$$

$$10-2y-1 \leq -12y-8-3$$

$$-2y+9 \leq -12y-11$$

$$-2y+12y \leq -11-9$$

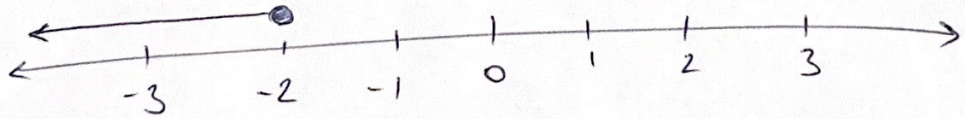
$$10y \leq -20$$

$$y \leq -2$$

Set Builder Notation: $\{y \mid y \leq -2\}$

Interval Notation: $(-\infty, -2]$

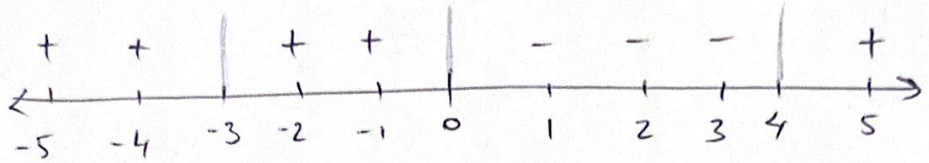
Graph:



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

$x+3=0$ $\quad x-4=0$

$x=-3$ $\quad x=4$



$f(-5) = -5(-5+3)^2(-5-4) = -(+)(-) = +$

$f(-1) = -1(-1+3)^2(-1-4) = -(+)(-) = +$

$f(2) = 2(2+3)^2(2-4) = +(+)(-) = -$

$f(5) = 5(5+3)^2(5-4) = +(+)(+) = +$

As we know, given in the definition $f(x) < 0$, so Ans: $(0, 4)$

(36)

$$2x^4 > 3x^3 + 9x^2$$

$$2x^4 - 3x^3 - 9x^2 > 0$$

$$2x^4 - 3x^3 - 9x^2 = 0$$

$$x^2(2x^2 - 3x - 9) = 0$$

$$x^2(2x+3)(x-3)$$

$2x+3=0$ $\qquad$ $x-3=0$

$2x=-3$ $\qquad$ $x=3$

$x=-\frac{3}{2}$

$$\left(-\infty, -\frac{3}{2}\right) \cup (3, \infty)$$

$f(x) = -\frac{1}{2}|4x-5|+3$ (37)

$-\frac{1}{2}|4x-5|+3 < 0$

$-\frac{1}{2}|4x-5| < -3$

$|4x-5| > \frac{-3}{-\frac{1}{2}}$ $\quad -\frac{3}{1}\cdot\frac{2}{-1} = \frac{-6}{-1} = 6$

$|4x-5| > 6$

$4x-5 > 6$ or $4x-5 < -6$

$4x > 11$ $\quad 4x < -1$

$x > \frac{11}{4}$ $\quad x < -\frac{1}{4}$ as long as we know this

$(-\infty, -\frac{1}{4}) \cup (\frac{11}{4}, \infty)$

$13 - 2|4x-7| \leq 3$

$13 - 8x - 14 \leq 3$

$-8x - 1 \leq 3$

$-8x \leq 4$

$x \geq \frac{4}{-8}$

$x \geq \frac{1}{-2}$

$13 - 2|4x-7| \leq 3$

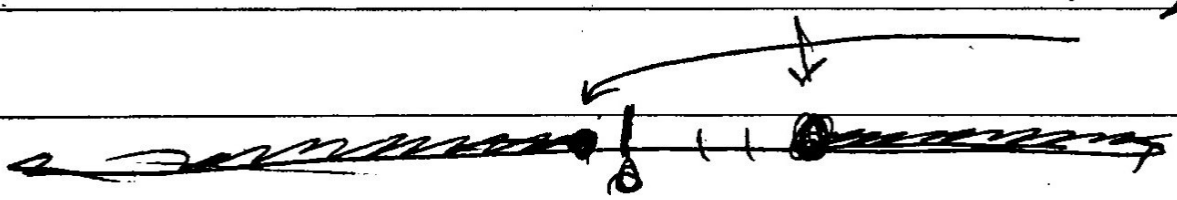
$\frac{-2|4x-7|}{-2} \leq \frac{-10}{-2}$

$|4x-7| \geq 5$

$4x-7 \geq 5$ or $4x-7 \leq -5$

$4x \geq 12$ $\quad 4x \leq 2$

$x \geq 3$ $\quad x \leq \frac{1}{2}$



$(-\infty, \frac{1}{2}] \cup [3, \infty)$