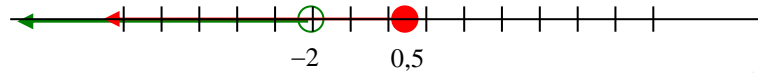
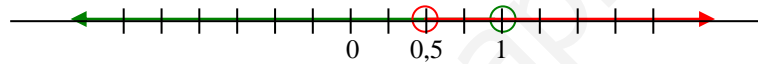


2. Resuelve los siguientes **sistemas de inecuaciones de primer grado**, tanto analítica como gráficamente:

$$(1) \begin{cases} 3x+5 < x+1 \\ -6x+1 \geq -2 \end{cases} \rightarrow \begin{cases} 2x < -4 \\ -6x \geq -3 \end{cases} \rightarrow \begin{cases} x < -2 \\ x \leq \frac{1}{2} \end{cases} \Rightarrow x \in (-\infty, -2)$$

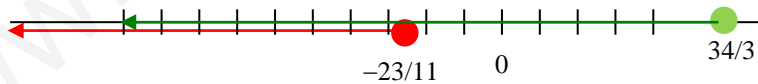


$$(2) \begin{cases} 2(x+3) - 3x > x+4 \\ -3x+5 < x+3 \end{cases} \rightarrow \begin{cases} -2x > -2 \\ -4x < -2 \end{cases} \rightarrow \begin{cases} x < 1 \\ x > \frac{1}{2} \end{cases} \Rightarrow x \in \left(\frac{1}{2}, 1\right)$$

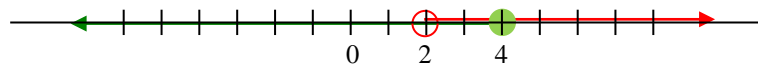


$$(3) \begin{cases} \frac{x+5}{2} \leq \frac{3x-1}{-5} \\ \frac{2(x-1)}{3} - 5 \leq \frac{x}{6} \end{cases} \rightarrow \begin{cases} -5(x+5) \geq 2(3x-1) \\ 4(x-1) - 30 \leq x \end{cases} \rightarrow \begin{cases} -5x-25 \geq 6x-2 \\ 4x-4-30 \leq x \end{cases} \rightarrow \begin{cases} -11x \geq 23 \\ 3x \leq 34 \end{cases}$$

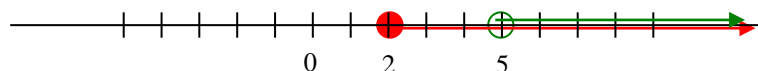
$$\rightarrow \begin{cases} x \leq -\frac{23}{11} \\ x \leq \frac{34}{3} \end{cases} \Rightarrow x \in \left(-\infty, -\frac{23}{11}\right]$$



$$(4) \begin{cases} 3(x-3) + 2x - 1 > 2(x-2) \\ -3(3x-1) \geq -21 - 3x \end{cases} \rightarrow \begin{cases} 3x-9+2x-1 > 2x-4 \\ -9x+3 \geq -21-3x \end{cases} \rightarrow \begin{cases} 3x > 6 \\ -6x \geq -24 \end{cases} \rightarrow \begin{cases} x > 2 \\ x \leq 4 \end{cases} \Rightarrow x \in (2, 4]$$

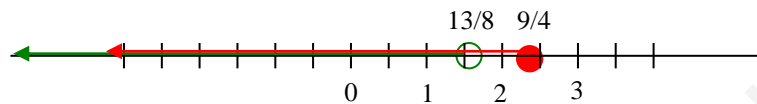


$$(5) \begin{cases} 3x-5+2(x+2) \geq 2x+5 \\ 4(2x-3)-5 > 23 \end{cases} \rightarrow \begin{cases} 3x-5+2x+4 \geq 2x+5 \\ 8x-12-5 > 23 \end{cases} \rightarrow \begin{cases} 3x \geq 6 \\ 8x > 40 \end{cases} \rightarrow \begin{cases} x \geq 2 \\ x > 5 \end{cases} \Rightarrow x \in (5, +\infty)$$



$$(6) \begin{cases} \frac{2x-3}{4} + \frac{1}{2} < \frac{6-3x}{2} \\ \frac{4}{1+2x} \leq \frac{6}{5x-3} \end{cases} \rightarrow \begin{cases} 2x-3+2 < 2(6-3x) \\ 4(5x-3) \leq 6(1+2x) \end{cases} \rightarrow \begin{cases} 2x-3+2 < 12-6x \\ 20x-12 \leq 6+12x \end{cases} \rightarrow \begin{cases} 8x < 13 \\ 8x \leq 18 \end{cases}$$

$$\rightarrow \begin{cases} x < \frac{13}{8} \\ x \leq \frac{9}{4} \end{cases} \Rightarrow x \in \left(-\infty, \frac{13}{8}\right)$$



3. Resuelve las siguientes **inecuaciones de segundo grado**, tanto analítica como gráficamente:

(1) $x^2 + x - 6 \leq 0$

$$x^2 + x - 6 = 0 \rightarrow x = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 1 \cdot (-6)}}{2 \cdot 1} = \frac{-1 \pm \sqrt{25}}{2} = \frac{-1 \pm 5}{2} = \begin{cases} x_1 = \frac{4}{2} = 2 \\ x_2 = \frac{-6}{2} = -3 \end{cases}$$

$(x-2)(x+3) \leq 0$

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

$$x \in [-3, 2]$$

(2) $(x-2)(x+1) \geq 18 \Leftrightarrow x^2 - x - 20 \geq 0$

$$x^2 - x - 20 = 0 \rightarrow x = \frac{1 \pm \sqrt{1^2 - 4 \cdot 1 \cdot (-20)}}{2 \cdot 1} = \frac{1 \pm \sqrt{81}}{2} = \frac{1 \pm 9}{2} = \begin{cases} x_1 = \frac{10}{2} = 5 \\ x_2 = \frac{-8}{2} = -4 \end{cases}$$

$(x-5)(x+4) \geq 0$

		-4		5	
$(x-5)$	-		-		+
$(x+4)$	-		+		+
$(x-5)(x+4)$	+		-		+

$$x \in (-\infty, -4] \cup [5, +\infty)$$

$$(3) (x-1)^2 - (x+2)^2 + 3x^2 \leq 1 - 7x \Leftrightarrow 3x^2 + x - 4 \leq 0$$

$$3x^2 + x - 4 = 0 \rightarrow x = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 3 \cdot (-4)}}{2 \cdot 3} = \frac{-1 \pm \sqrt{49}}{6} = \frac{-1 \pm 7}{6} = \begin{cases} x_1 = \frac{6}{6} = 1 \\ x_2 = \frac{-8}{6} = -\frac{4}{3} \end{cases}$$

$$3(x-1)\left(x + \frac{4}{3}\right) \leq 0$$

		$-\frac{4}{3}$	1
$(x-1)$	-	-	+
$\left(x + \frac{4}{3}\right)$	-	+	+
$(x-1)\left(x + \frac{4}{3}\right)$	+	-	+

$$x \in \left[-\frac{4}{3}, 1\right]$$

$$(4) 2x^2 \geq 5x - 3 \Leftrightarrow 2x^2 - 5x + 3 \geq 0 \rightarrow 2\left(x - \frac{3}{2}\right)(x-1) \geq 0$$

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

$$x \in (-\infty, 1] \cup \left[\frac{3}{2}, +\infty\right)$$

$$(5) \frac{x-3}{4} > (x-2)(x+7) + 17 \Leftrightarrow 4x^2 + 19x + 15 < 0 \rightarrow 4(x+1)\left(x + \frac{15}{4}\right) < 0$$

		$-\frac{15}{4}$	-1
$(x+1)$	-	-	+
$\left(x + \frac{15}{4}\right)$	-	+	+
$(x+1)\left(x + \frac{15}{4}\right)$	+	-	+

$$x \in \left(-\frac{15}{4}, -1\right)$$

$$(6) 9x^2 - 6x + 1 \leq 0 \rightarrow 9\left(x - \frac{1}{3}\right)^2 \leq 0$$

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

$$(7) -5(x-6)(x+1) < 0$$

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

$$x \in (-1, 6)$$

$$(8) (2x+5)(x-3) \leq 0$$

		$-\frac{5}{2}$		3	
$(2x+5)$	-		+		+
$(x-3)$	-		-		+
$(2x+5)(x-3)$	+		-		+

$$x \in \left[-\frac{5}{2}, 3\right]$$

$$(9) 3(2x-14)(3x+12) \geq 0$$

		-4		7	
$(2x+5)$	-		-		+
$(x-3)$	-		+		+
$(2x+5)(x-3)$	+		-		+

$$x \in (-\infty, -4] \cup [7, +\infty)$$