Desigualdades.

1. Desigualdades del tipo $ax + b \geq 0$ con $a \neq 0$ y $a, b \in \mathbb{R}$

Resolver las siguientes desigualdades

1. $3x \geq 3$
2. $-5x \leq 2$
3. $-x > 7$
4. $-6 \leq -3x$
5. $3x + 2 > 0$
6. $4x - 5 < 3$
7. $\frac{3}{8}x - 1 \leq 0$
8. $-\frac{x}{7} + 5 < 0$
9. $-\frac{x}{5} + \frac{1}{5} \geq 1$
10. $\frac{1}{3} - \frac{2}{5}x > \frac{5}{2}$
11. $3 \geq \frac{4}{5} - x$
12. $0 < -\frac{3}{8}x - 1$
13. $\frac{5}{2}x - 1 \geq -1$
14. $\frac{2}{3}x + \frac{9}{2} \leq -\frac{9}{2}$
15. $5(x - 1) \geq 3$

16. $\frac{3}{2}(-3+x) \leq 0$

17. $\left(-\frac{3}{2}x-1\right)\frac{1}{2} \leq 2$

18. $-6 \leq 5\left(-\frac{9}{2}x+2\right)$

19. $\frac{4}{3} \geq (x-5)\left(-\frac{2}{5}\right)$

20. $6\left(2x-\frac{1}{2}\right) \geq (-1)(6)$

Respuestas

1. $3x \geq 3$

   $3x \geq 3 \Rightarrow x \geq \frac{3}{3} = 1 \Rightarrow x \geq 1$ el conjunto solución es $S = [1, +\infty)$

2. $-5x \leq 2$

   $-5x \leq 2 \Rightarrow x \geq \frac{2}{-5} \Rightarrow S = \left[-\frac{2}{5}, +\infty\right)$

3. $-x > 7$

   $-x > 7 \Rightarrow x < -7 \Rightarrow S = (-\infty, -7)$

4. $-6 \leq -3x$

   $-6 \leq -3x \Rightarrow \frac{-6}{-3} \geq x \Rightarrow S = (-\infty, 2]$

5. $3x + 2 > 0$

   $3x + 2 > 0 \Rightarrow 3x > -2 \Rightarrow x > -\frac{2}{3} \Rightarrow S = \left(-\frac{2}{3}, +\infty\right)$

6. $4x - 5 < 3$

   $4x - 5 < 3 \Rightarrow 4x < 3 + 5 \Rightarrow 4x < 8 \Rightarrow x < \frac{8}{4} \Rightarrow x < 2 \Rightarrow S = (-\infty, 2)$

7. $\frac{3}{8}x - 1 \leq 0$

   $\frac{3}{8}x - 1 \leq 0 \Rightarrow \frac{3}{8}x \leq 1 \Rightarrow x \leq \frac{8}{3} \Rightarrow S = \left(-\infty, \frac{8}{3}\right]$

8. $-\frac{x}{7} + 5 < 0$

   $-\frac{x}{7} + 5 < 0 \Rightarrow \frac{x}{-7} < -5 \Rightarrow x < -5 \Rightarrow x > (-5)(-7) \Rightarrow S = (35, +\infty)$

9. $-\frac{x}{5} + \frac{1}{5} \geq 1$

   $-\frac{x}{5} + \frac{1}{5} \geq 1 \Rightarrow \frac{x}{-5} \geq 1 - \frac{1}{5} \Rightarrow \frac{x}{-5} \geq \frac{4}{5} \Rightarrow x \leq \frac{4(-5)}{5} \Rightarrow x \leq \frac{4(-5)}{5} \Rightarrow S = (-\infty, -4]$

10. $\frac{1}{3}-\frac{2}{5}x>\frac{5}{2}$

$\frac{1}{3}-\frac{2}{5}x>\frac{5}{2} \Rightarrow \frac{2x}{-5}>\frac{5}{2}-\frac{1}{3}=\frac{15-2}{6}=\frac{13}{6} \Rightarrow \frac{2x}{-5}>\frac{13}{6} \Rightarrow x<\frac{13(-5)}{6(2)} \Rightarrow x<-\frac{65}{12} \Rightarrow$

$\Rightarrow S=\left(-\infty,-\frac{65}{12}\right)$

11. $3\geq\frac{4}{5}-x$

$3\geq\frac{4}{5}-x \Rightarrow 3-\frac{4}{5}\geq -x \Rightarrow \frac{11}{5}\geq -x \Rightarrow -\frac{11}{5}\leq x \Rightarrow S=\left[\frac{-11}{5},+\infty\right)$

12. $0<-\frac{3}{8}x-1$

$0<-\frac{3}{8}x-1 \Rightarrow \frac{3}{8}x<-1 \Rightarrow x<\frac{(-1)8}{3} \Rightarrow x<-\frac{8}{3} \Rightarrow S=\left(-\infty,-\frac{8}{3}\right)$

13. $\frac{5}{2}x-1\geq -1$

$\frac{5}{2}x-1\geq -1 \Rightarrow \frac{5}{2}x\geq -1+1 \Rightarrow \frac{5}{2}\geq 0 \Rightarrow x\geq 0\cdot\frac{2}{5} \Rightarrow x\geq 0 \Rightarrow S=[0,+\infty)$

14. $\frac{2}{3}x+\frac{9}{2}\leq -\frac{9}{2}$

$\frac{2}{3}x+\frac{9}{2}\leq -\frac{9}{2} \Rightarrow \frac{2}{3}x\leq -\frac{9}{2}-\frac{9}{2}=\frac{-9-9}{2}=\frac{-18}{2}=-9 \Rightarrow \frac{2}{3}x\leq -9 \Rightarrow$

$\Rightarrow x\leq\frac{(-9)3}{2}=\frac{-27}{2} \Rightarrow x\leq -\frac{27}{2} \Rightarrow S=\left(-\infty,-\frac{27}{2}\right]$

15. $5(x-1)\geq 3$

$5(x-1)\geq 3 \Rightarrow 5x-5\geq 3 \Rightarrow 5x\geq 3+5=8 \Rightarrow 5x\geq 8 \Rightarrow x\geq\frac{8}{5} \Rightarrow S=\left[\frac{8}{5},+\infty\right)$

16. $\frac{3}{2}(-3+x)\leq 0$

$\frac{3}{2}(-3+x)\leq 0 \Rightarrow -3+x\leq 0\cdot\frac{2}{3}=0 \Rightarrow -3+x\leq 0 \Rightarrow x\leq 3 \Rightarrow S=(-\infty,3]$

17. $\left(-\frac{3}{2}x-1\right)\frac{1}{2}\leq 2$

$\left(-\frac{3}{2}x-1\right)\frac{1}{2}\leq 2 \Rightarrow \frac{-3}{2}x-1\leq 2\cdot 2=4 \Rightarrow -\frac{3}{2}x\leq 4+1=5 \Rightarrow \frac{3}{-2}x\leq 5 \Rightarrow$

$$\Rightarrow\ x \geq \frac{5(-2)}{3} = -\frac{10}{3}\ \Rightarrow\ S = \left[-\frac{10}{3}, +\infty\right)$$

18. $-6 \leq 5\left(-\frac{9}{2}x + 2\right)$

$$-6 \leq 5\left(-\frac{9}{2}x + 2\right) \Rightarrow \frac{-6}{5} \leq -\frac{9}{2}x + 2 \Rightarrow -\frac{6}{5} - 2 \leq -\frac{9}{2}x \Rightarrow \frac{-16}{5} \leq \frac{9}{-2}x \Rightarrow \frac{(-16)(-2)}{5 \cdot 9} \geq x \Rightarrow$$

$$\Rightarrow\ \frac{32}{45} \geq x\ \Rightarrow\ S = \left(-\infty, \frac{32}{45}\right]$$

19. $\frac{4}{3} \geq (x-5)\left(-\frac{2}{5}\right)$

$$\frac{4}{3} \geq (x-5)\left(-\frac{2}{5}\right) \Rightarrow \frac{\frac{4}{3}}{\frac{-2}{5}} = -\frac{4 \cdot 5}{3 \cdot 2} = -\frac{10}{3} \leq x - 5 \Rightarrow -\frac{10}{3} + 5 \leq x \Rightarrow \frac{5}{3} \leq x \Rightarrow S = \left[\frac{5}{3}, +\infty\right)$$

20. $6\left(2x - \frac{1}{2}\right) \geq (-1)(6)$

$$6\left(2x - \frac{1}{2}\right) \geq (-1)(6)\ \Rightarrow\ 2x - \frac{1}{2} \geq \frac{(-1)6}{6} = -1\ \Rightarrow\ 2x \geq -1 + \frac{1}{2} = -\frac{1}{2}\ \Rightarrow\ 2x \geq -\frac{1}{2}\ \Rightarrow$$

$$\Rightarrow\ x \geq -\frac{1}{2 \cdot 2} = -\frac{1}{4}\ \Rightarrow\ x \geq -\frac{1}{4}\ \Rightarrow\ S = \left[-\frac{1}{4}, +\infty\right)$$