

Questions from Homework

Functions Toolkit 2

1. Solve the following $|3x-2| > 7$

$$\begin{aligned} 3x-2 &> 7 \\ 3x &> 9 \\ \boxed{x > 3} \end{aligned}$$

$$\begin{aligned} 3x-2 &< -7 \\ 3x &< -5 \\ \boxed{x < -\frac{5}{3}} \end{aligned}$$

2. Solve the following $-9 \leq |2x-5| \leq 13$

$$\begin{aligned} -9 &\leq 2x-5 \leq 13 \\ -4 &\leq 2x \leq 18 \\ -2 &\leq x \leq 9 \end{aligned}$$

$$\begin{aligned} 9 &\geq 2x-5 \geq -13 \\ 14 &\geq 2x \geq -8 \\ 7 &\geq x \geq -4 \\ -4 &\leq x \leq 7 \end{aligned}$$

3. Solve for x $1 + \sqrt{x-3} = x-2$

$$\sqrt{x-3} = x-3$$

← Square both sides

$$x-3 = x^2 - 6x + 9$$

$$0 = x^2 - 7x + 12$$

$$0 = (x-4)(x-3)$$

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

$$\checkmark x=4 \quad | \quad \checkmark x=3$$

Both are solutions

6. Simplify the following rational expressions.

a) $\frac{4}{x^2 - x - 30} - \frac{2}{x^2 + 8x + 15}$

b) $\frac{2x}{3x+5} + \frac{x}{3x^2 - x - 10}$

c) $\frac{3x+6}{x^2} \times \frac{x}{x^2+2x}$

d) $\frac{2}{x} + \frac{3}{xy}$ $\frac{2y+3}{2+3x}$ $x \neq 0, -\frac{2}{3}$
 $y \neq 0$

a) $\frac{4}{(x-6)(x+5)} - \frac{2}{(x+5)(x+3)}$

c) $\frac{3(x+2)}{x^2} \times \frac{x}{x(x+2)}$

$$\frac{4(x+3) - 2(x-6)}{(x-6)(x+5)(x+3)}$$

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

$$\frac{4x+12-2x+12}{(x-6)(x+5)(x+3)}$$

$$\frac{3}{x^2}$$

$$\frac{2x+24}{(x-6)(x+5)(x+3)}$$

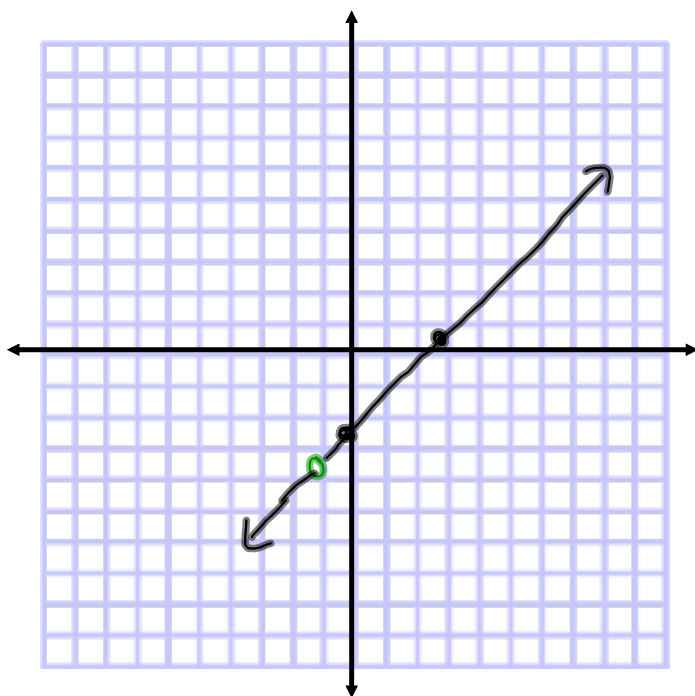
$$x \neq 0, -2$$

$$x \neq -5, -3, 6$$

9. Sketch the following rational function

$$a) f(x) = \frac{x^2 - 2x - 3}{x+1} = \frac{(x-3)\cancel{(x+1)}}{\cancel{(x+1)}} = x-3$$

- ① Roots: $x=3$ ② yint: $y=-3$ ③ VA: None ④ OA: $y=x-3$ ⑤ Holes: $x=-1$



$$\begin{aligned} f(-1) &= (-1) - 3 \\ &= -4 \\ &(-1, -4) \end{aligned}$$