

# Answers

## IB PreHL Solving Rational Inequalities WS

5. a. **TABULAR** Copy and complete the table below.

$f(x) = \frac{x-1}{ x+2 }$	(1, 0)	$x = -2$
$g(x) = \frac{12x-5}{x-3}$	( <del>5</del> 2, 0)	$x = 3$
$h(x) = \frac{ x+4 }{ 3x-1 }$	(-4, 0)	$x = 1/3$

$$2x - 5 = 0$$

$$x = 5/2$$

b. **GRAPHICAL** Graph each function in part a. *Graph in calc.*

c. **SYMBOLIC** Create a sign chart for each inequality. Include zeros and undefined points and evaluate the sign of the numerators and denominators separately.

i.  $\frac{x-1}{|x+2|} < 0$

ii.  $\frac{12x-5}{x-3} \geq 0$

iii.  $\frac{|x+4|}{|3x-1|} > 0$

d. **NUMERICAL** Write the solution for each inequality in part c.

i)  $(-\infty, -2) \cup (-2, 1)$

ii)  $[3, \infty)$

iii)  $(-\infty, -4) \cup (-4, 1/3) \cup (1/3, \infty)$

6. **ERROR ANALYSIS** Ajay and Mae are solving  $\frac{x^2}{(3-x)^2} \geq 0$ .

Ajay thinks that the solution is  $(-\infty, 0] \cup [0, \infty)$ , and Mae thinks that the solution is  $(-\infty, \infty)$ . Is either of them correct? Explain your reasoning.

when you plug in 0 you get  $\frac{0}{0} = 0$ . 0 is  $\geq 0$ , so Mae is correct

7.  $\frac{2n+1}{3n+1} \leq \frac{n-1}{3n+1}$

8.  $1 + \frac{3y}{1-y} > 2$

9.  $\frac{2x}{4} - \frac{5x+1}{3} > 3$

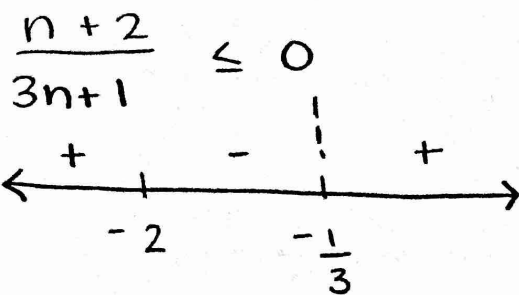
10.  $\frac{4x-2}{x+1} \geq -2$

11.  $\frac{4x-28}{(x-5)(x+1)} \geq 2$

12.  $\frac{x+1}{(x-4)(x+8)} \geq 0$

$$7) \quad \frac{2n+1}{3n+1} \leq \frac{n-1}{3n+1}$$

$$\frac{2n+1}{3n+1} - \frac{n-1}{3n+1} \leq 0$$



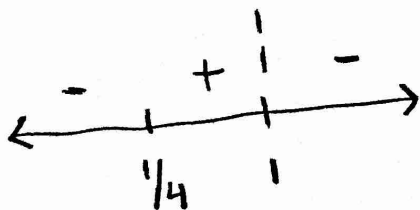
$$\boxed{\left[-2, -\frac{1}{3}\right)}$$

$$8) \quad 1 + \frac{3y}{1-y} > 2$$

$$-1 + \frac{3y}{1-y} > 0$$

$$\frac{-1+y}{1-y} + \frac{3y}{1-y} > 0$$

$$\frac{-1+4y}{1-y} > 0$$



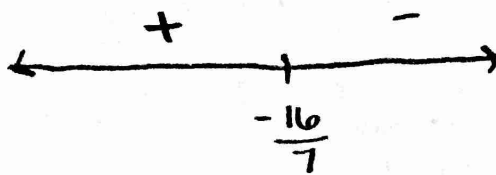
$$\boxed{\left(\frac{1}{4}, 1\right)}$$

9)

$$\frac{2x}{4} - \frac{5x+1}{3} > 3$$

$$\frac{6x}{12} - \frac{20x+4}{12} - \frac{36}{12} > 0$$

$$\frac{-14x - 32}{12} > 0$$



$$\boxed{(-\infty, -16/7)}$$

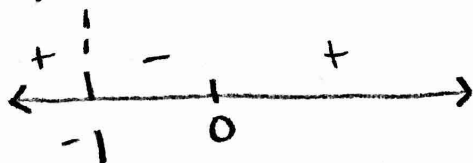
10)

$$\frac{4x-2}{x+1} \geq -2$$

$$\frac{4x-2}{x+1} + 2 \geq 0$$

$$\frac{4x-2}{x+1} + \frac{2x+2}{x+1} \geq 0$$

$$\frac{6x}{x+1} \geq 0$$



$$[-1, 0]$$

11)

$$\frac{4x-28}{(x-5)(x+1)} \geq 2$$

$$\frac{4(x-7)}{(x-5)(x+1)} - 2 \geq 0$$

$$\frac{4x-28}{(x-5)(x+1)} - \frac{2(x-5)(x+1)}{(x-5)(x+1)} \geq 0$$

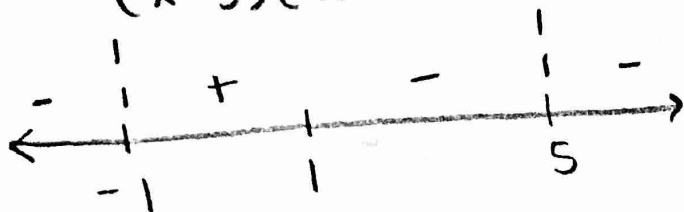
$$\frac{4x-28}{(x-5)(x+1)} - \frac{2(x^2-4x-5)}{(x-5)(x+1)} \geq 0$$

$$\frac{4x-28 - (2x^2 - 8x - 10)}{(x-5)(x+1)} \geq 0$$

$$\frac{-2x^2 + 12x + 10}{(x-5)(x+1)} \geq 0$$

$$\frac{-2(x^2 - 6x + 5)}{(x-5)(x+1)} \geq 0$$

$$\frac{-2(x-5)(x-1)}{(x-5)(x+1)} \geq 0$$

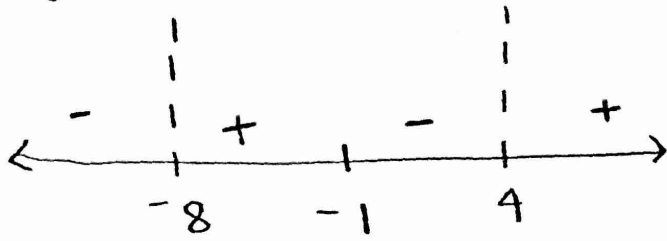


$$\boxed{(-1, 1]}$$

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



$$\frac{x+1}{(x-4)(x+8)} \geq 0$$



$$\boxed{[-8, -1] \cup (4, \infty)}$$

$$\frac{-}{(-)(-)}$$

$$\frac{-}{(-)(+)}$$

$$\frac{+}{+ (+)}$$