

Solving Rational Inequalities

1. Solve each of the following algebraically.

$$\text{a) } \frac{3x+1}{x-3} \geq 0$$

$$\text{b) } \frac{x^2-6x-7}{x+5} > 0$$

$$\text{c) } \frac{-5}{2x^2+3x-2} \leq 0$$

$$\text{d) } \frac{(x-2)^2(5-x)}{(4-x)^3} < 0$$

$$\text{e) } \frac{x+1}{x-2} > \frac{x+7}{x+1}$$

$$\text{f) } \frac{x+3}{x+1} \geq \frac{x-2}{x-3}$$

2. Illustrate your solution to part c) above using a sketch.

3. Given $f(x) = \frac{2x}{1-x}$, determine the values of x for which $f(f(x)) \leq -\frac{3}{2}$, $x \in \mathbb{R}$.

Answers

1. a) $x \leq -\frac{1}{3}, x > 3$ b) $-5 < x < -1, x > 7$ c) $x < -2, x > 1/2$ d) $4 < x < 5$
e) $2 < x < 5, x < -1$ f) $-1 < x < 3, x \geq 7$

3. $\frac{1}{3} < x < 1, 1 < x \leq 3$

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