

3.4 Solve Rational Equations and Inequalities

BLM 3-5

1. Solve algebraically. Check each solution.

a) $\frac{6}{2x-1} = 5$

b) $\frac{6}{x} = x - 5$

c) $1 = \frac{5}{3x^2 - 8x + 2}$

d) $\frac{x+5}{x-1} = \frac{x+1}{x-3}$

2. Use
- Technology**
- Solve each equation using technology. Express your answers to two decimal places.

a) $\frac{2x-5}{x+2} = \frac{x}{3x-1}$

b) $\frac{x}{3x+2} = \frac{x^2+5}{x-1}$

3. Solve each inequality without using technology. Illustrate the solution on a number line.

a) $\frac{4}{2x-3} < \frac{1}{x+4}$

b) $\frac{2x+3}{x-3} \geq \frac{6x-5}{3x+1}$

c) $\frac{(x-3)(2x-1)}{(x+4)(x-5)} > 0$

d) $\frac{2x^2+5x-3}{x^2+5x+4} \leq 0$

4. Solve and check.

a) $\frac{3}{x+5} + \frac{4}{x} = 0$

b) $2x = 5 - \frac{3}{x}$

c) $\frac{2}{1-x} + \frac{3}{x+1} = \frac{1}{x}$

d) $\frac{3}{x-1} + 5 + \frac{2}{x} = 0$

5. Each inequality is of the form
- $f(x) > g(x)$
- , where
- $f(x)$
- and
- $g(x)$
- are both rational functions. Graph
- f
- and
- g
- and use the graphs to solve each inequality.

a) $\frac{x}{x+3} > \frac{x}{x-1}$

b) $\frac{2x+3}{x} > \frac{x+1}{x}$

6. Jordan has a sister who is three years older than he is, and a brother who is two years younger than he is. How old must Jordan be in order that the ratio of his sister's age to his brother's age is less than 2?

7. The amount of energy needed to increase the radius of orbit of a 500-kg satellite from its original orbit of radius 10 000 km can be modelled by the

function $E = 2 \times 10^{10} \left(\frac{r-10\,000}{r} \right)$, where

 E is the energy, in Joules, and r is the new radius, in kilometres.

- a) Calculate the new radius of the satellite if
- 10^{10}
- Joules of energy are added to it.

- b) How much energy must be given to the satellite in order for it to escape Earth's gravity completely (make its orbit's radius infinitely large)?

8. Shade the area of the Cartesian plane

where $x^2 + 1 \leq y \leq \frac{10}{x^2 + 4}$.

9. Solve for
- A
- and
- B
- :

$$\frac{13x+1}{2x^2+3x-2} = \frac{A}{2x-1} + \frac{B}{x+2}.$$