

Method: To solve a rational equation

Multiply both sides of the equation by the LCD. This is called *clearing fractions* and produces an equation similar to those we have already solved. After solving this equation, make sure to check your result for extraneous solutions.

Example 1: Solve

a.)  $\frac{1}{2} - \frac{2}{t} = \frac{3}{2t}$

b.)  $\frac{x-2}{x-4} = \frac{2}{x-4}$  (after solving, observe the graphs)

c.)  $\frac{x}{x+1} + \frac{5}{x} = \frac{1}{x^2+x}$

$$d.) \frac{3-2y}{y+1} - \frac{10}{y^2-1} = \frac{2y+3}{1-y}$$

Example 2: Consider  $f(x) = \frac{3x-1}{x^2-7x+10}$  and  $g(x) = \frac{x-1}{x^2-4} + \frac{2x+1}{x^2-3x-10}$ . Find all values of  $a$  such that  $f(a) = g(a)$ .

Example 3: Solve

$$\text{a.) } \frac{3}{x} + \frac{x}{x+2} = \frac{4}{x^2 + 2x}$$

$$\text{b.) } \frac{y+3}{y+2} - \frac{y}{y^2-4} = \frac{y}{y-2}$$

Example 4: Find all values of  $x$  for which the rational function  $g(x) = \frac{x-3}{x+2}$  is equal to  $\frac{1}{5}$

Example 5: For the functions  $f(x) = \frac{x+4}{3x}$  and  $g(x) = 2 - \frac{x+8}{5x}$ , find all values of  $a$  for which  $f(a) = g(a)$ .