

# Solving Rational Functions (1.2)



"My mom says just one more snow day and I'll be spending it at your house."

$$\frac{1}{2} + \frac{4}{7}$$

$$\frac{1}{2} \cdot \frac{7}{7} + \frac{4}{7} \cdot \frac{2}{2} = \frac{7}{14} + \frac{8}{14}$$

$$7 + 8 = 14x$$

~~12x~~

$$\left( \frac{100 - 4u}{3} \right) = \left( \frac{5u + 6}{4} + 6 \right)$$

The image shows a handwritten equation with several annotations. A red bracket is drawn around the left-hand side of the equation,  $\frac{100 - 4u}{3}$ . A yellow highlight is placed over the equals sign. A red bracket is drawn around the right-hand side,  $\frac{5u + 6}{4} + 6$ . A red arrow labeled '12' points from the top of the right-hand side back to the left-hand side, indicating a common denominator of 12. Another red arrow labeled '3' points from the top of the right-hand side to the denominator '4', indicating a multiplication factor of 3 to clear the denominator.

$$400 - 16u = 15u + 18 + 72$$

$$\frac{1}{\cancel{x-2}} \stackrel{(x-2)(x+2)}{=} \frac{3}{\cancel{x+2}} \stackrel{(x+2)(x-2)}{-} \frac{6x}{\cancel{(x-2)(x+2)}} \stackrel{\downarrow}{x^2-4}$$

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

$$4x = -8$$

$$x = -2$$

extraneous!

NO sol!

## Extraneous Solution-

any value that does not truly satisfy  
the equation  
(Denominators  $\neq 0$ )

$$\frac{1}{\cancel{x-3}} + \frac{1}{\cancel{x+3}} = \frac{10}{\cancel{x^2-9}}$$

$(x-3)(x+3)$        $(x-3)(x+3)$        $(x-3)(x+3)$

$\downarrow$   
 $(x-3)(x+3)$

$$x+3 + x-3 = 10$$

$$2x = 10$$

$$x = 5$$

$$\frac{6}{\cancel{x}} - \frac{2}{\cancel{x+3}} = \frac{3x+15}{\cancel{x^2+3x}}$$

*Handwritten notes in blue:*  
- Above the 6:  $x(x+3)$   
- Above the 2:  $x(x+3)$   
- Above the 15:  $x(x+3)$   
- Below the denominator:  $x(x+3)$

$$6x+18 - 2x = 3x+15$$

$$x = -3$$

extraneous!

~~⊘~~



Solve.

$$\frac{7x}{x-7} = 9 + \frac{53}{x-7}$$

$$7x = 9x - 63 + 53$$

$$-2x = -10$$

$$x = 5$$

Solve.

$$\frac{1}{x-3} = \frac{6}{x+3} - \frac{12x}{x^2-9}$$

- a.  $x = 3$ .  $(x-3)(x+3)$
- b.  $x = \pm 3$   $x+3 = 6x-18-12x$
- c. no solution ✓  $7x = -21$
- d. None of the above.  $x = -3$

Solve.

$$\frac{2}{x} = \frac{-56}{x-78} - 1$$

- a.  $x = 26$  and  $x = 6$
- b.  $x = -26$  and  $x = 6$
- c.  $x = 26$  and  $x = -6$
- d. None of the above.

$$2x - 196 = -56x - x^2 - 78x$$

$$x^2 - 20x - 196 = 0$$

$$(x - 26)(x + 6)$$

$a, -b$

$$\frac{2}{x} = \frac{-56}{x-78} - \frac{x-78}{x-78}$$

$$\frac{2}{x} \neq \frac{-x+22}{x-78}$$

