

Rational Equations Review

Solve each equation. Remember to check for extraneous solutions.

$$1) \frac{k+2}{2k} = 4 + \frac{k+1}{2k} \quad \text{LCD: } 2k$$

$$k+2 = 8k + k+1$$

$$\frac{k+2}{k-1} = \frac{9k+1}{-k-1}$$

$$1 = 8k$$

$$\frac{1}{8} = k$$

$$2) \frac{1}{a} + \frac{1}{6a} = \frac{a+4}{3a} \quad \text{LCD: } 6a^2$$

$$6+a = 2(a+4)$$

$$\frac{6+a}{-a} = \frac{2a+8}{-a-8}$$

$$-2 = a$$

$$3) \frac{3}{x-4} = \frac{5}{x-4} + \frac{x+1}{x(x-4)} \quad \text{LCD: } x(x-4)$$

$$3x = 5x + x + 1$$

$$3x = 6x + 1$$

$$-3x = 1$$

$$x = -\frac{1}{3}$$

$$4) \frac{5x-15}{6x^2} + \frac{x^2+2x+1}{6x^2} = \frac{2}{6x} \quad \text{LCD: } 6x^2$$

$$5x-15 + x^2+2x+1 = 2x$$

$$x^2+7x-14 = 2x$$

$$x^2+5x-14 = 0$$

$$(x+7)(x-2) = 0$$

$$x = -7 \quad x = 2$$

$$5) 1 + \frac{5}{a+1} = \frac{a^2+a-12}{(a+1)(a-2)}$$

$$\text{LCD: } (a+1)(a-2)$$

$$6) \frac{5}{x-1} - 1 = \frac{x-6}{x-1} \quad \text{LCD: } x-1$$

$$5 - (x-1) = x-6$$

$$5 - x + 1 = x - 6$$

$$\begin{array}{r} +x \quad +x \\ 6 = 2x - 6 \end{array}$$

$$12 = 2x$$

$$6 = x$$

$$(a+1)(a-2) + 5(a-2) = a^2+a-12$$

$$a^2-a-2+5a-10 = a^2+a-12$$

$$\frac{a^2+4a-12}{-a^2-a+12} = \frac{a^2+a-12}{-a^2-a+12}$$

$$3a = 0$$

$$a = 0$$

$$7) \frac{2}{x-1} = \frac{x-1}{x-6} - \frac{1}{x-1} \quad \text{LCD: } (x-1)(x-6)$$

$$2(x+6) = x-1 - (x+6)$$

$$2x+12 = x-1-x-6$$

$$2x+12 = -7$$

$$2x = -19$$

$$x = -\frac{19}{2}$$

$$8) \frac{1}{n-1} = \frac{3}{n^2+5n-6} - \frac{n+1}{n^2+5n-6} \quad \text{LCD: } (n+6)(n-1)$$

$$n+6 = 3 - n - 1$$

$$\frac{n+6}{n+2} = \frac{2-n}{-n}$$

$$2 = -2n$$

$$-1 = n$$

Solve each proportion.

$$9) \frac{7}{x-5} \times \frac{10}{x+8}$$

$$10(x-5) = 7(x+8)$$

$$\begin{array}{r} 10x - 50 = 7x + 56 \\ -7x + 50 \quad -7x + 50 \\ \hline 3x = 106 \end{array}$$

$$3x = 106$$

$$x = \frac{106}{3}$$

$$10) \frac{3}{v} \times \frac{4}{2}$$

$$4v = 6$$

$$x = \frac{6}{4} = \frac{3}{2}$$

$$11) \frac{r-9}{5} \times \frac{r}{2}$$

$$2(r-9) = 5r$$

$$2r - 18 = 5r$$

$$-18 = 3r$$

$$-6 = r$$

$$12) \frac{n}{n-5} \times \frac{2}{n+9}$$

$$n^2 + 9n = 2n - 10$$

$$n^2 + 7n + 10 = 0$$

$$(n+5)(n+2) = 0$$

$$n = -5 \quad n = -2$$

Check

$$-5 - 5 = -10 \quad -2 - 5 = -7 \checkmark$$

$$-5 + 9 = 4 \checkmark \quad -2 + 9 = 7 \checkmark$$

$$13) \frac{6}{x+9} \times \frac{x+4}{x+9}$$

$$\frac{6(x+4)}{(x+9)} = \frac{(x+4)(x+4)}{(x+9)}$$

$$6 = x+4$$

$$2 = x$$

$$14) \frac{4}{x+3} \times \frac{10}{x+6}$$

$$10(x+3) = 4(x+6)$$

$$10x + 30 = 4x + 24$$

$$\begin{array}{r} -4x - 30 \quad -4x - 30 \\ \hline 6x = -6 \end{array}$$

$$6x = -6$$

$$x = -1$$

$$15) -\frac{4}{b-7} \times \frac{b}{3}$$

$$b^2 - 7b = -12$$

$$b^2 - 7b + 12 = 0$$

$$(b-4)(b-3) = 0$$

$$b = 4 \quad b = 3$$

$$16) 3 \times \frac{b+3}{8}$$

$$b+3 = 24$$

$$b = 21$$