

Rational Equations Review

Solve each equation. Remember to check for extraneous solutions.

$$1) \frac{(k+2) \cancel{2k}}{2k} = 4 + \frac{\cancel{2k}(k+1) \cancel{2k}}{2k}$$

$$k+2 = 4 \cdot 2k + k+1$$

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

$$-8k = -1$$

$$k = 1/8$$

$$3) \frac{3 \cancel{x(x-4)}}{(x-4)(x-4)} = \frac{5 \cancel{x(x-4)} + (x+1) \cancel{x(x-4)}}{x^2-4x \cancel{x(x-4)}}$$

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

$$3x = 6x + 1$$

$$-3x = 1$$

$$x = -1/3$$

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

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

$$a^2+3a+2+5a+10 = a^2+a-12$$

$$8a+12 = a-12$$

$$7a = -24$$

$$a = -24/7$$

$$7) \frac{(x-1)(x+6) \cancel{2}}{(x-1)(x+6)(x-1)} = \frac{1 \cancel{(x-1)(x+6)} - 1 \cancel{(x-1)(x+6)}}{(x-1)(x+6)}$$

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

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

$$2x+12 = -7$$

$$2x = -19$$

$$x = -19/2$$

$$2) \frac{\cancel{6a^2} \cdot 1}{a^2} + \frac{1 \cancel{6a^2}}{6a} = \frac{(a+4) \cancel{6a^2}}{3a^2}$$

$$6 \cdot 1 + 1 \cdot a = (a+4) \cdot 2$$

$$6+a = 2a+8$$

$$-a = 2$$

$$a = -2$$

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

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

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

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

$$x+7=0 \quad x-2=0$$

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

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

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

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

$$-x + 6 = x - 6$$

$$-2x = -12$$

$$x = 6$$

$$8) \frac{(n-1)(n+6) \cancel{1}}{n-1} = \frac{3 \cancel{(n-1)(n+6)} - (n+1) \cancel{(n-1)(n+6)}}{n^2+5n-6}$$

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

$$n+6 = -n+2$$

$$2n = -4$$

$$n = -2$$

Solve each proportion.

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

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

$$10x - 50 = 7x + 56$$

$$3x = 106$$

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

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

$$4v = 6$$

$$v = \frac{6}{4}$$

$$v = \frac{3}{2}$$

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

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

$$5r = 2r - 18$$

$$3r = -18$$

$$r = -6$$

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

$$2(n-5) = n(n+9)$$

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

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

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

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

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

← This is easier if you multiply by the LCD!

$$(x+4)(x+9) = 6(x+9)$$

$$x^2 + 13x + 36 = 6x + 54$$

$$x^2 + 7x - 18 = 0$$

$$(x+9)(x-2) = 0$$

extraneous ~~x = 9~~ $x = 2$
you get 0 in the denominator when you check.

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

$$b(b-7) = -4 \cdot 3$$

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

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

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

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

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

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

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

$$6x = -6$$

$$x = -1$$

$$16) \frac{3}{1} = \frac{b+3}{8}$$

$$b+3 = 24$$

$$b = 21$$