

Perform the indicated operation.

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

$$\frac{11x}{x-1}$$

2.)  $\frac{3}{4v^2+4v} - \frac{7}{2} \cdot \frac{2v(v+1)}{2v(v+1)}$

$$\frac{3}{4v(v+1)} - \frac{14v(v+1)}{4v(v+1)}$$

$$\frac{3}{4v(v+1)} - \frac{(14v^2+14v)}{4v(v+1)}$$

$$\frac{-14v^2-14v+3}{4v(v+1)}$$

3.)  $\frac{3}{x+7} - \frac{4}{x-8}$

$$\frac{3(x-8)}{(x+7)(x-8)} - \frac{4(x+7)}{(x+7)(x-8)}$$

$$\frac{3x-24}{(x+7)(x-8)} - \frac{(4x+28)}{(x+7)(x-8)}$$

$$\frac{-x-52}{(x+7)(x-8)}$$

4.)  $\frac{5}{n+5} + \frac{4n}{2n+6}$

$$\frac{5-2(n+3)}{2(n+3)(n+5)} + \frac{4n(n+5)}{2(n+3)(n+5)}$$

$$\frac{10n+30}{2(n+3)(n+5)} + \frac{4n^2+20n}{2(n+3)(n+5)}$$

$$\frac{4n^2+30n+30}{2(n+3)(n+5)} \rightarrow \frac{2(2n^2+15n+15)}{2(n+3)(n+5)}$$

$$= \frac{2n^2+15n+15}{(n+3)(n+5)}$$

5.)  $\frac{7}{3x^2-6x} + \frac{x^2}{x^2-4x+4}$

$$\frac{7(x-2)}{3x(x-2)(x-2)} + \frac{x^2 \cdot 3x}{3x(x-2)(x-2)}$$

$$\frac{7x-14}{3x(x-2)(x-2)} + \frac{3x^3}{3x(x-2)(x-2)}$$

$$\frac{3x^3+7x-14}{3x(x-2)(x-2)}$$

6.)  $\frac{x^2+3x}{x^2+6x+8} \cdot \frac{x^2+x-2}{4x^3+12x^2}$

$$\frac{x(x+3)}{(x+4)(x+2)} \cdot \frac{(x+2)(x-1)}{4x^2(x+3)}$$

$$\frac{(x-1)}{4x(x+4)}$$

$$7.) \frac{b^2-100}{b^2} \div \frac{3b^2-31b+10}{2b}$$

$$\frac{\cancel{(b-10)}(b+10)}{b^2} \cdot \frac{2b}{(3b-1)\cancel{(b-10)}}$$

$$\boxed{\frac{2(b+10)}{b(3b-1)}}$$

$$8.) \frac{x^2-2x-15}{8x+20} \div \frac{6x^3-30x^2}{4x+10}$$

$$\frac{\cancel{(x-5)}(x+3)}{4\cancel{(2x+5)}} \cdot \frac{2\cancel{(2x+5)}}{6x^2\cancel{(x-5)}}$$

$$\boxed{\frac{(x+3)}{12x^2}}$$

Solve the following rational equations. (Don't forget to check for extraneous answers)

$$9.) \frac{3}{k-3} + \frac{4}{k-4} = \frac{25}{k^2-7k+12}$$

LCD:  $(k-4)(k-3)$

$$3(k-4) + 4(k-3) = 25$$

$$3k-12 + 4k-12 = 25$$

$$7k-24 = 25$$

$$7k = 49$$

$$\boxed{k = 7}$$

$$10.) \frac{1}{2h} + \frac{5}{h} = \frac{3}{h-1}$$

LCD:  $2h(h-1)$

$$1(h-1) + 5 \cdot 2(h-1) = 3 \cdot 2h$$

$$h-1 + 10h-10 = 6h$$

$$11h-11 = 6h$$

$$-11 = -5h$$

$$\boxed{h = \frac{-11}{-5} = \frac{11}{5}}$$

$$11.) \frac{4}{w-2} = \frac{-1}{w+3}$$

$$4(w+3) = -1(w-2)$$

$$\begin{array}{r} 4w+12 = -w+2 \\ +w-12 \quad +w-12 \\ \hline 5w = -10 \end{array}$$

$$\boxed{w = -2}$$

$$12.) \frac{c+1}{c-3} = 4 - \frac{12}{c^2-2c-3}$$

LCD:  $(c-3)(c+1)$

$$(c+1)(c+1) = 4(c-3)(c+1) - 12$$

$$c^2+2c+1 = 4(c^2-2c-3) - 12$$

$$c^2+2c+1 = 4c^2-8c-12-12$$

$$0 = 3c^2-10c-25$$

$$0 = 3c^2-15c+5c-25$$

$$0 = (3c^2-15c) + (5c-25)$$

$$0 = 3c(c-5) + 5(c-5)$$

$$0 = (c-5)(3c+5)$$

$$c-5=0 \quad 3c+5=0$$

$$\boxed{c=5}$$

$$\boxed{c=-5/3}$$

$$\begin{array}{r} -75 \\ -15 \times 5 \\ \hline -10 \end{array}$$

$$\text{LCD} : (x-4)(x-2)$$

$$13.) \frac{x}{x-2} + \frac{1}{x-4} = \frac{2}{x^2-6x+8}$$

$$(x-4)(x-2)$$

$$x(x-4) + 1(x-2) = 2$$

$$x^2 - 4x + x - 2 = 2$$

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$$x-4=0$$

$$x=4$$

$$x+1=0$$

$$x=-1$$

EXTRANEALS

Simplify.

$$14.) \frac{21n^2-56n}{56n}$$

$$\frac{7n(3n-8)}{56n}$$

$$\boxed{\frac{3n-8}{8}}$$

$$15.) \frac{2x+4}{x+2}$$

$$\frac{2(x+2)}{(x+2)}$$

$$\boxed{2}$$

$$16.) \frac{k+2}{k^2-3k-10}$$

$$\frac{k+2}{(k-5)(k+2)}$$

$$\boxed{\frac{1}{k-5}}$$

$$17.) \frac{2x^2-2x}{5x^2-7x+2}$$

$$\frac{2x(x-1)}{(x-1)(5x-2)}$$

$$\boxed{\frac{2x}{5x-2}}$$

$$18.) \frac{20m^2-28m}{8m^2-24m}$$

$$\frac{4m(5m-7)}{8m(m-3)}$$

$$\boxed{\frac{5m-7}{2(m-3)}}$$

$$19.) \frac{7n^2-44n+12}{5n-30}$$

$$\frac{(7n-2)(n-6)}{5(n-6)}$$

$$\boxed{\frac{7n-2}{5}}$$

Challenge!

$$\frac{\frac{2c^2+9c+9}{c+1}}{\frac{10c^2+19c+6}{5c^2+7c+2}}$$

$$\frac{(2x+3)(x+3)}{(x+1)} \div \frac{(2x+3)(5x+2)}{(x+1)(5x+2)}$$

$$\frac{\cancel{(2x+3)}(x+3)}{\cancel{(x+1)}} \cdot \frac{\cancel{(x+1)}(5x+2)}{(2x+3)(5x+2)}$$

$$\boxed{x+3}$$

