

Name KEY

Name the undefined values for each problem. Remember, when in doubt...

1)  $\frac{1}{x} + \frac{2}{x-8}$

$x \neq \underline{0, 8}$

2)  $\frac{x}{2x+5} - \frac{4}{x+2}$

$x \neq \underline{-5/2, -2}$

3)  $\frac{3}{x^2-9} + \frac{3}{5}$   
 $(x+3)(x-3)$

$x \neq \underline{\pm 3}$

4)  $\frac{x-1}{x^2+5x-14} - \frac{6x}{5x-10}$   
 $(x+7)(x-2) \quad 5(x-2)$

$x \neq \underline{-7, 2}$

Multiply or divide each expression.

Remember...

5)  $\frac{-1w}{-2w^2y} \cdot \frac{5x^2}{25x^2}$   
 $\frac{15x^2}{14w^2y^2}$   
 $3 \quad 7y$

$= -\frac{5wx^2}{21yz^5}$

**Mult & Div.**

- 1) factor
- 2) cancel
- 3) mult. across

**Add & Subt.**

- 1) factor
- 2) find common denom.s
- 3) simplify numerator
- 4) check to see if numerator factors again
- 5) write denominator for final answer

6)  $\left(\frac{2n^2}{3w}\right)^3 \cdot \frac{27w^4}{10n^4}$   
 $\frac{4n^2}{5} \cdot \frac{27w^4w}{10n^4}$   
 $\frac{27w^8}{10n^4}$   
 $5$   
 $= \frac{4n^2w}{5}$

7)  $\frac{a^5y^3}{wy^7} \div \frac{a^3w^2}{w^5y^2}$   
 $\frac{a^2y^3}{wy^7} \cdot \frac{w^5y^2w^2}{a^3w^2}$   
 $\frac{a^2w^2}{y^2}$

8)  $\frac{5-p}{p^3q} \div \frac{p^2-25}{p^4q}$   
 $\frac{-1(p-5)}{p^3q} \cdot \frac{p^4q}{(p-5)(p+5)}$   
 $= \frac{-p}{p+5}$

9)  $\frac{b^2+2b+1}{3b^2} \cdot \frac{6b}{b^2-4b-5}$   
 $\frac{(b+1)(b+1)}{b \cdot 3b} \cdot \frac{6b}{(b-5)(b+1)}$   
 $= \frac{2(b+1)}{b(b-5)}$

10)  $\frac{r^3}{a^2-25} \div \frac{2r}{5-a} \cdot \frac{ar+5r}{8}$   
 $\frac{r^3}{(a+5)(a-5)} \cdot \frac{-1(a-5)}{2a} \cdot \frac{a(a+5)}{8}$   
 $= -\frac{r^3}{16}$

Add or subtract each expression.

Remember...

$$11) \frac{(4b)^2}{(4b)^3 a} + \frac{(3a)}{4b} + \frac{7a}{12ab}$$

**Mult & Div.**

- 1) factor
- 2) cancel
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Num:  $8b + 15a + 7a$

$$= \frac{8b + 22a}{12ab} \leftarrow \begin{matrix} \text{Has a} \\ \text{GCF} \end{matrix} = \frac{\cancel{2}(4b + 11a)}{\cancel{12}ab} = \frac{4b + 11a}{6ab}$$

$$12) \frac{(2a)^2}{2a(a+2)} - \frac{3(a+2)}{2a(a+2)}$$

Num:  $4a - 3a - 6$

$$= \frac{a - 6}{2a(a+2)}$$

$$13) \frac{3}{x+2} + \frac{4x+5}{3x+6}$$

$$= \frac{(3)3}{(3)(x+2)} + \frac{4x+5}{3(x+2)}$$

Num:  $9 + 4x + 5$

$$= \frac{4x + 14}{3(x+2)}$$

$$14) \frac{x}{3-x} - \frac{2}{x^2 - 4x + 3}$$

$$= \frac{x(x-1)}{(-1)(x-3)(x-1)} - \frac{2}{(x-3)(x-1)}$$

Num:  $\frac{-x^2 + x - 2}{(x-3)(x-1)}$

OR:  $\frac{x^2 - x + 2}{(3-x)(x-1)}$

$$15) \frac{(z+1)4z}{(z+1)^2 - 4} + \frac{z+4}{z+1} \frac{(z-4)}{(z-4)}$$

Num:  $4z^2 + 4z + z^2 - 16$

$$= \frac{5z^2 + 4z - 16}{(z+1)(z-4)}$$

$$16) c + \frac{2c}{c+1}$$

$$= \frac{(c+1)c}{(c+1)^1} + \frac{2c}{c+1}$$

Num:  $c^2 + c + 2c$

$$= \frac{c^2 + 3c}{c+1}$$

$$17) \frac{3}{y^2 + y - 12} - \frac{2}{y^2 + 6y + 8}$$

$$= \frac{3(y+2)}{(y+4)(y-3)(y+2)} - \frac{2(y-3)}{(y+4)(y+2)(y-3)}$$

Num:  $3(y+2) - 2(y-3)$   
 $3y + 6 - 2y + 6$

$$= \frac{y + 12}{(y+2)(y+4)(y-3)}$$