

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Part 1: Simplify completely. Identify any values that are undefined.**

1.  $\frac{16x^{11}}{8x^2}$

$2x^9$ ,  $x \neq 0$

2.  $\frac{x^2 + x - 2}{x^2 + 2x - 3}$

$\frac{x+2}{x+3}$ ,  $x \neq -3, 1$

3.  $\frac{4x - x^2}{x^2 - 2x - 8}$

$\frac{-x}{x+2}$ ,  $x \neq 4, -2$

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

$\frac{2x+1}{2x-3}$ ,  $x \neq -\frac{2}{3}, \frac{3}{2}$

**Part 2: Multiply the rational expression \*Factor + cancel\***

5.  $\frac{x^2 - 16}{x + 5} \cdot \frac{2x + 10}{x - 4}$

$2(x+4)$

6.  $\frac{x^2 + 9x + 18}{4 - x^2} \cdot \frac{2 - x}{x^2 + 6x}$

$\frac{(x+3)}{x(x+2)}$

7.  $\frac{x^3 - x}{2x^2 + 12x} \cdot \frac{x - 3}{x^2 - 4x + 3}$

$\frac{(x+1)}{2(x+6)}$

**Part 3: Divide the rational expression KCF, Factor + cancel**

8.  $\frac{4x^3}{9x^2y} \div \frac{16}{9y^5}$

$\frac{xy^4}{4}$

9.  $\frac{8m^2}{4m+16} \div \frac{2m^2 + 6m}{m+3}$

$\frac{m}{m+4}$

10.  $\frac{x^2 - 4}{x^2 - x - 6} \div \frac{2x - 4}{9 - 3x}$

$-\frac{3}{2}$

**Part 4: Add the rational expression. Identify any values that are undefined.**

11.  $\frac{x-3}{x+4} + \frac{x-2}{x+4}$

$\frac{2x-5}{x+4}$ ,  $x \neq -4$

12.  $\frac{4}{x-2} + \frac{2x}{x^2-4}$

$\frac{2(3x+4)}{(x+2)(x-2)}$ ,  $x \neq -2, 2$

13.  $\frac{x+4}{x^2-x-12} + \frac{2x}{x-4}$

$\frac{2x^2+7x+4}{(x-4)(x+3)}$ ,  $x \neq 4, -3$

\*Find LCD, Combine like terms in numerator, reduce @end\*

**Part 5: Subtract the rational expression. Identify any values that are undefined.**

14.  $\frac{x^2 - 4}{x - 4} - \frac{5x + 10}{x - 4}$

$\frac{(x-7)(x+2)}{(x-4)}$ ,  $x \neq 4$

15.  $\frac{4}{x+4} - \frac{3}{x-1}$

$\frac{x-16}{(x-1)(x+4)}$ ,  $x \neq 1, -4$

16.  $\frac{x+6}{x^2 - 7x - 18} - \frac{2x}{x-9}$

$\frac{-2x^2 - 3x + 6}{(x-9)(x+2)}$ ,  $x \neq 9, -2$

*\* Find LCD, don't forget to distribute negative sign \**

**Part 6: Complex Fractions**

17.  $\frac{\frac{20}{x-1}}{\frac{6}{3x-3}}$

$\frac{10}{1}$

18.  $\frac{\frac{x+3}{6}}{1 + \frac{x}{3}}$

$\frac{1}{2}$

19.  $\frac{\frac{x}{2} - 4}{9 + \frac{2}{x}}$

$\frac{x(x-8)}{2(9x+2)}$

*\* Dividing Problem \**

*\* Simplify numerator + denominator then KCF \**

**Part 7: Solving. Look for extraneous solutions.**

20.  $\frac{4}{x} + 3 = \frac{x+4}{2}$

$x \neq 0$   
LCD:  $2x$

$x = -2, 4$

21.  $\frac{2}{x-6} = \frac{-5}{x+1}$

$x \neq 6, -1$   
*\* cross multiply \**

$x = 4$

22.  $\frac{x}{x-1} = \frac{2x+10}{x+11}$

$x \neq 1, -11$   
*\* cross multiply \**

$x = 5, -2$

23.  $\frac{5x}{x-2} = 7 + \frac{10}{x-2}$

$x \neq 2$   
LCD:  $(x-2)$

~~$x = 2$~~

No Solution