

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

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

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

10

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: Rational Exponents

20. $\frac{3xy}{12x^{\frac{1}{2}}y^{\frac{-1}{3}}}$

$\frac{x^{\frac{1}{2}} y^{\frac{4}{3}}}{4}$

21. $\sqrt[5]{486a^{12}b^3c^{25}}$

$3a^2c^5 \sqrt[3]{2a^2b^3}$

22. $\sqrt[3]{\frac{a}{2c}}$

$\frac{\sqrt[3]{4ac^2}}{2c}$

23. $2x\sqrt[3]{81x^4y^5} + y\sqrt[3]{192x^7y^2}$

$10x^2y \sqrt[3]{3xy^2}$

Part 8: Solving Radicals

24. $\frac{1}{2}(x-4)^{\frac{3}{2}} = 3$

$x \approx 7.302$

25. $\sqrt[4]{2x} - 13 = -9$

$x = 128$

26. $2\sqrt[3]{10-3x} = \sqrt[3]{2-x}$

$x = \frac{78}{23}$

27. $\sqrt{4x} = x - 8$

$x = \cancel{16}$