

Name: Key

Date: _____

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

1. $\frac{4x^2}{40x^2 - 12x}$

$\frac{x}{10x-3}$

2. $\frac{x-4}{x^3-64}$

$\frac{1}{x^2+4x+16}$

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

$\frac{3x}{x-2}$

4. $\frac{5x^2+18x-8}{10x^2-x-2}$

$\frac{(5x-2)(x+4)}{(5x+2)(2x-1)}$

Part 2: Multiply the rational expression

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

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

6. $\frac{x^2+5x-36}{x^2-49} \cdot x^2-11x+28$

$\frac{(x+9)(x-4)^2}{(x+7)}$

7. $\frac{5x^3y}{x^2y^2} \cdot \frac{y^3}{15x^2}$

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

Part 3: Divide the rational expression

8. $\frac{5x^2y^3}{x^7} \div \frac{30xy^4}{y^3}$

$\frac{y^2}{6x^6}$

9. $\frac{x^2-6x-27}{2x^2+2x} \div \frac{x^2-14x+45}{x^2}$

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

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

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

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

11. $\frac{12}{5x} + \frac{7}{6x}$

$\frac{107}{30x}$

12. $\frac{9}{x-3} + \frac{2x}{x+1}$

$\frac{2x^2+3x+9}{(x+1)(x-3)}$

13. $\frac{-15x}{x^2-8x+16} + \frac{12}{x-4}$

$\frac{-3(x+16)}{(x-4)^2}$

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

$$14. \frac{x-4}{5x} - \frac{12}{5(x-4)}$$

$$\frac{x^2 - 20x + 16}{5x(x-4)}$$

$$15. \frac{x+4}{x^2-4} - \frac{15}{x-2}$$

$$\frac{-2(7x+13)}{(x+2)(x-2)}$$

$$16. \frac{x^2-5}{x^2+5x-14} - \frac{x+3}{x+7}$$

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

Part 6: Complex Fractions

$$17. \frac{\frac{x}{3}-6}{10+\frac{4}{x}}$$

$$\frac{x(x-18)}{6(5x+2)}$$

$$18. \frac{\frac{16}{x-2}}{\frac{4}{x+1} + \frac{6}{x}}$$

$$\frac{8x(x+1)}{(x-2)(5x+3)}$$

$$19. \frac{15-\frac{2}{x}}{\frac{x}{5}+4}$$

$$\frac{5(15x-2)}{x(x+20)}$$

Part 7: Rational Exponents

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

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

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

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

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

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

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

$$9x^2y \sqrt[3]{3xy^2}$$

Part 8: Solving Radicals

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

$$x = 4 + \sqrt[3]{36}$$

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

$$x = 128$$

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

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

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

$$x = \cancel{4}, 16$$