PERIOD

NAME _____ DATE _____ ~~SCORE~~ _____

Rational Algebraic Expressions

Simplify each rational expression. #1-12 ALL

1. $\dfrac{5z^3 + z^2 - z}{3z}$ _____

2. $\dfrac{4a^2 - 9}{10a + 15}$ _____

3. $\dfrac{12b - 6}{6b^2 - b - 1}$ _____

4. $\dfrac{3x^2 + 3xy}{3x^2 - 3xy}$ _____

5. $\dfrac{m^2 - 25}{m^2 + 5m}$ _____

6. $\dfrac{3a^2 + 6a + 3}{3a^2 - 3}$ _____

7. $\dfrac{e^2 + 10e + 25}{5e + e^2}$ _____

8. $\dfrac{h^2 - 3(h + 6)}{18 + h(3 - h)}$ _____

9. $\dfrac{s^2 + 4(1 + s)}{s^2 - 4}$ _____

10. $\dfrac{3a^3 + 3b^3}{5a^2 - 5ab + 5b^2}$ _____

11. $\dfrac{v^2 - u^2}{u^2 + 2uv + v^2}$ _____

12. $\dfrac{cd - 2d^2 + c^2}{c^2 - 4cd + 3d^2}$ _____

In Exercises 13–24 a rational function is defined. Determine the domain of the function. Find the zeros of the function. #13-23 odd

13. $f(a) = \dfrac{a - 1}{a - 2}$ _____

14. $k(x) = \dfrac{4 - x}{x^2 - 9}$ _____

15. $h(b) = \dfrac{3b - 9}{4b + 3}$ _____

16. $F(c) = \dfrac{c^2 - c - 2}{c^2 - c}$ _____

17. $G(x) = \dfrac{3x^2 - 11x + 6}{x^2 + x}$ _____

18. $E(y) = \dfrac{2y^2 - 13y - 15}{3y + 5}$ _____

19. $z(e) = \dfrac{e^3 + 2e^2 + e}{3 + e^2}$ _____

20. $c(j) = \dfrac{2j^2 - 5j + 2}{j^3 - 36j}$ _____

21. $Q(n) = \dfrac{n^4 - 16}{n + 2n^2}$ _____

22. $e(t) = \dfrac{t^4 - t^2 - 12}{t^3 - 16t}$ _____

23. $d(h) = \dfrac{h^4 + 6h^2 + 8}{h^4 - 5h^2 + 4}$ _____

24. $H(d) = \dfrac{d^4 - 10d^2 + 9}{2d^3 - 32d}$ _____

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Products and Quotients; Sums and Differences

Simplify. Write answers without negative or zero exponents. #1-9 Odd

1. $\frac{10r^5}{21s^2} \cdot \frac{3s}{5r^3}$ _____

2. $\frac{9a}{10b} \div \frac{3a^3}{20b}$ _____

3. $\frac{4p^4q}{9r} \cdot \frac{9r^3}{10p^2q^2} \cdot \frac{15pq}{2r}$ _____

4. $\frac{25u^6v}{4w^5} \cdot \frac{9v}{10u^2w} \div \frac{15u^3v}{2w^7}$ _____

5. $\frac{a^2 - 5a + 6}{a + 4} \cdot \frac{3a + 12}{a - 2}$ _____

6. $\frac{6b^2 + 5b + 1}{3b - 6} \div \frac{4b^2 + 4b + 1}{2 - b}$ _____

7. $\frac{6d - 9}{5d + 1} \div \frac{6 - 13d + 6d^2}{15d^2 - 7d - 2}$ _____

8. $\frac{25h^2 + 10h + 1}{12h - 18} \cdot \frac{10h - 15}{25h^2 - 1}$ _____

9. $\frac{n^2 - 1}{n^2 - 3n - 10} \cdot \frac{n^2 + 5n + 6}{n^2 - 3n - 4} \cdot \frac{n^2 - n - 20}{n^2 + 2n - 3}$ _____

10. $\frac{3z^2 + 6z - 45}{z^2 - 2z} \cdot \frac{10 - 7z + z^2}{6z^2 + 33z + 15} \div \frac{15 - 8z + z^2}{10z^2 + 5z}$ _____

Simplify. #11-22 All

11. $\frac{2x}{5} - \frac{x}{3}$ _____

12. $\frac{b}{2a} - \frac{a}{b}$ _____

13. $\frac{4 + 3y}{3y} - \frac{1 + 2y}{2y}$ _____

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

15. $\frac{b - a}{a^2b} + \frac{a + b}{ab^2}$ _____

16. $\frac{r - s}{rs} - \frac{r^2s + 1}{r^2s^2}$ _____

17. $\frac{2 - m}{3m} + \frac{m^2 - 2}{5m^2}$ _____

18. $\frac{u + 2}{u - 1} - \frac{v + 2}{v + 1}$ _____

19. $\frac{2 - a^2}{a^2 + a} + \frac{3a + 4}{3a + 3}$ _____

20. $\frac{3}{c^2 - 4} - \frac{2}{3c - 6}$ _____

21. $\frac{5}{2u^2 - u} + \frac{10}{2u + u^2}$ _____

22. $\frac{2}{3z^2 + 2z} - \frac{6}{9z^2 + 12z + 4}$ _____