

Unit 11 - Rational Expressions and Functions Review Guide

Simplify the following rational expressions.

1.
$$\frac{30x^2y}{15x+10xy}$$

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

3.
$$\frac{2x+4y}{2xy}$$

4.
$$\frac{9a+6ab}{3a}$$

5.
$$\frac{5a^2b+5a^2c}{15ab+15ac}$$

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

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Multiply the following rational expressions.

7.
$$\frac{3x+6}{x} \times \frac{x}{3x}$$

8.
$$\frac{a-b}{3a^2b^3} \times \frac{9a^4b^2}{a-b}$$

9.
$$\frac{5a-5b}{xy^2} \times \frac{x^2y}{2a-2b}$$

10.
$$\frac{r^2+r}{4} \times \frac{8}{r^2-1}$$

Divide the following rational expressions.

11.
$$\frac{25p^{10}}{9p^5} \div \frac{15p^6}{10p^4}$$

12.
$$\frac{4c+4}{c^2-25} \div \frac{20}{c^2-5c}$$

13.
$$\frac{5x-20}{10x} \div \frac{7x-28}{14x^2}$$

14.
$$\frac{4a+12}{2a-10} \div \frac{a^2-9}{a^2-a-20}$$

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Divide the following Polynomials

15. $50x^5 - 7x^4 + x^2$ by x

16. $5b^4 - 10b^3 - 15b^2 + 10b$ by $5b$

17. $a^3 - 6a^2 + 12a - 8$ by $a - 2$

18. $y^2 - y - 110$ by $y + 10$

19. $12x^3 - 5x^2 - 3x - 5$ by $4x - 3$

20. $27x^3 + 8$ by $3x + 2$

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Add or subtract the following rational expressions.

21.
$$\frac{p^2}{p-1} + \frac{-p}{p-1}$$

22.
$$\frac{3s+7}{s^2-9} + \frac{s+5}{s^2-9}$$

23.
$$\frac{4}{5z} - \frac{1}{2z}$$

24.
$$\frac{4x}{x^2-36} + \frac{2}{x-6}$$

25.
$$\frac{x}{3} - \frac{2y}{3} + \frac{z}{3}$$

26.
$$\frac{6-4p}{8} - \frac{3-3p}{6}$$

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Find the unknown value of the following rational expressions.

27. $\frac{6}{x-3} = 3$

28. $5 - \frac{12}{a} = \frac{5}{3}$

29. $\frac{4t}{3} = 15 - \frac{t}{6}$

30. $\frac{6}{b} + 22 = 24$

31. $\frac{x}{12} + \frac{x}{6} = 1$

32. $\frac{1}{x} + \frac{1}{16} = \frac{1}{10}$

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Solve Problems Involving Inverse Variation.

Variable z is inversely proportional to a . If $z = 5$ when $a = 15$

33. Find z when $a = 20$.

34. Find z when $a = 10$.

35. How long will it take a car to travel a certain distance at 80 km/h if the same distance can be traveled in 6 hours at 40km/h.

36. The time required for two pipes to drain a pool is 10 hours. How long will it take for 5 pipes to drain the same pool?

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37. Find the y-intercept of $f(x) = \frac{4x-2}{x+2}$.

38. Find the x-intercept of $f(x) = \frac{4x-2}{x+2}$.

39. Find the vertical and horizontal asymptote of $f(x) = \frac{4x-2}{x+2}$.