

Simplify and state excluded values.

1. $\frac{10x-5}{x+2} \cdot \frac{2x+4}{6x^2-3x}$

2. $\frac{x+5}{x^2+3x-10} \cdot \frac{10x-10}{6x^3-6x^2}$

3. $\frac{x^2+8x+15}{x-4} \div \frac{x^2-25}{4x^2-16x}$

4. $\frac{x^2+2x-15}{5x^2-15x} \div \frac{x^2+2x-15}{12-4x}$

Simplify using addition and subtraction.

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

6. $\frac{x+1}{x-4} - \frac{x-2}{x+3}$

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

8. $\frac{2}{x^2+x-6} + \frac{x-5}{x^2+2x-8}$

Solve for x. Remember to check for extraneous solutions.

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

10. $\frac{4}{x-6} = \frac{x+5}{x^2-6x} + \frac{1}{x^2-6x}$

11. $\frac{1}{x-3} - \frac{1}{x^2+2x^2-15x} = \frac{x+4}{x^2-3x}$

12. $\frac{1}{x-1} + \frac{x+4}{3} = \frac{x+6}{3}$

For the following, simplify by factoring. Also, find the Holes, Vertical Asymptote(s), Horizontal Asymptote, Slant Asymptote, x-intercept(s), and y-intercept. If NONE exist, write the word "NONE." Then sketch the graph.

$$13. f(x) = \frac{x+3}{x-4}$$

$$14. f(x) = \frac{x^2 - 2x - 3}{x^2 + 3x + 2}$$

$$15. f(x) = \frac{x+2}{x^2 - x - 6}$$

$$16. f(x) = \frac{x-2}{x^2 - 9}$$

$$17. f(x) = \frac{x^2 - 1}{x^2 - 4}$$

$$18. f(x) = \frac{x^3 + x^2 - 12x}{x^2 + 2x - 8}$$

Answer each variation question.

19. The number of bricks laid varies directly with the amount of time spent. If 45 bricks are laid in 65 minutes, determine the equation that represents this situation. Also determine the time it would take to lay 500 bricks.

20. The cost c of materials for a deck varies jointly with the width w and the length l . If $c = \$470.40$ when $w = 12$ and $l = 16$, find the cost when $w = 10$ and $l = 25$.

21. The number of gallons g in a circular swimming pool varies jointly with the square of the radius r^2 and the depth d . If $g = 754$ when $r = 4$ and $d = 2$, find the number of gallons in the pool when $r = 3$ and $d = 1.5$.

22. The time to complete a project varies inversely with the number of employees. If 3 people can complete the project in 7 days, how long will it take 5 people?

23. The weight of a person varies inversely as the square of the distance from the center of the earth. If the radius of the earth is 4000 miles, how much would a 180 pound person weigh, 2000 miles above the surface of the earth?

24. The strength of a rectangular beam varies jointly as its width and the square of its depth. If the strength of a beam three inches wide by 10 inches deep is 1200 pounds per square inch, what is the strength of a beam four inches wide and six inches deep?