

~~FOCUS~~

Simplify each algebraic fraction. State the excluded values of the variables.

1. $\frac{4x^2y^2}{16yx^3}$

2. $\frac{6abc^3}{3a^2b^2}$

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

4. $\frac{a^2-b^2}{a+b}$

5. $\frac{4x-4}{4x+4}$

6. $\frac{6m-6n}{m^2-n^2}$

7. $\frac{x+3}{x^2+6x+9}$

8. $\frac{k^2-8k+16}{k^2-16}$

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

10. $\frac{a^2-3a-28}{a^2+3a-4}$

Express each product or quotient in simplest form.

11. $\frac{xy}{xz} \cdot \frac{y}{x}$

12. $\frac{a^2b(2b)}{b^2c(a)}$

13. $\frac{y^2-9}{4} \cdot \frac{8}{y+3}$

14. $\frac{(x+2)^2}{8} \cdot \frac{72}{x^2-4}$

15. $\frac{2a^2+a}{4a^2-1} \cdot \frac{6a-3}{4a}$

16. $\frac{5m+15}{8m+4} \cdot \frac{4m+2}{3m+9}$

17. $\frac{x^2-1}{2x-6} \cdot \frac{x^2-9}{3x-3}$

18. $\frac{4s+s^2}{8+2s} \cdot \frac{4}{2s^3}$

19. $\frac{y^2+y-2}{y^2-2y-15} \cdot \frac{y^2-6y+5}{y^2+5y+6}$

20. $\frac{s^2+2s-8}{s^2+3s-10} \cdot \frac{s^2+6s+5}{s^2+5s+4}$

21. $\frac{6}{x} \div \frac{2}{y}$

22. $\frac{rs^2}{t} \div \frac{r^2s}{t}$

23. $\frac{5m}{m+1} \div \frac{25m^2}{m^2+2m+1}$

24. $\frac{10-5x}{6+3x} \div \frac{5}{12+6x}$

25. $\frac{x-y}{x+y} \div \frac{x^2+y^2}{x^2-y^2}$

26. $\frac{4a+12}{a^2-9} \div \frac{2a+6}{2a-6}$

27. $\frac{a^2-b^2}{a-b} \div \frac{2a+2b}{4a-4b}$

28. $\frac{3x^2-3y^2}{9} \div \frac{2x^2-2y^2}{3(x-y)^2}$

SIMPLIFYING EXPRESSIONS Simplify the expression if possible.

9. $\frac{4x}{20}$

10. $\frac{15x}{45}$

11. $\frac{-18x^2}{12x}$

12. $\frac{14x^2}{50x^4}$

13. $\frac{3x^2 - 18x}{-9x^2}$

14. $\frac{42x - 6x^3}{36x}$

15. $\frac{7x}{12x + x^2}$

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

17. $\frac{12 - 5x}{10x^2 - 24x}$

18. $\frac{x^2 + 25}{2x + 10}$

19. $\frac{5 - x}{x^2 - 8x + 15}$

20. $\frac{2x^2 + 11x - 6}{x + 6}$

21. $\frac{x^2 + x - 20}{x^2 + 2x - 15}$

22. $\frac{x^3 + 9x^2 + 14x}{x^2 - 4}$

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

UNDEFINED VALUES For what values of the variable is the rational expression undefined? [State the excluded values.]

24. $\frac{7}{x - 3}$

25. $\frac{11}{x - 8}$

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

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

28. $\frac{x + 9}{x^2 + x - 12}$

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

SIMPLIFYING EXPRESSIONS Simplify the expression.

12. $\frac{4x}{3} \cdot \frac{1}{x}$

13. $\frac{9x^2}{4} \cdot \frac{8}{18x}$

14. $\frac{7x^2}{6x} \cdot \frac{12x^2}{2x}$

15. $\frac{16x^2}{8x} \div \frac{4x^2}{16x}$

16. $\frac{25x^2}{10x} \div \frac{5x}{10x}$

17. $\frac{13x^4}{7x} \div \frac{x^3}{7x}$

18. $\frac{5 - 2x}{-2} \cdot \frac{24}{10 - 4x}$

19. $\frac{4x}{x^2 - 9} \cdot \frac{x - 3}{8x^2 + 12x}$

20. $\frac{-3}{x - 4} \cdot \frac{x - 4}{12(x - 7)}$

21. $\frac{3x^2}{10} \div \frac{9x^3}{25}$

22. $\frac{x}{x + 2} \div \frac{x + 5}{x + 2}$

23. $\frac{5x + 15}{3x} \div \frac{x + 3}{9x}$

24. $\frac{2(x + 2)}{5(x - 3)} \div \frac{4(x - 2)}{5x - 15}$

25. $\frac{x^2 - 36}{-5x^2} \div (x - 6)$

26. $\frac{8}{2 + 3x} \cdot (8 + 12x)$

27. $\frac{3x}{x^2 - 2x - 24} \cdot \frac{x - 6}{6x^2 + 9x}$

28. $\frac{x}{3x^2 + 2x - 8} \cdot (3x - 4)$

29. $\frac{x + 1}{x^3(3 - x)} \div \frac{5}{x(x - 3)}$

30. $(4x^2 + x - 3) \cdot \frac{1}{(4x + 3)(x - 1)}$

31. $\frac{x^2 - 8x + 15}{x^2 - 3x} \div (3x - 15)$

32. $\frac{6x^2 + 7x - 33}{x + 4} \div (6x - 11)$

33. $\left(\frac{x^2}{5} \cdot \frac{x + 2}{2}\right) \div \frac{x}{30}$

34. $\left(\frac{2x^2}{3} \cdot \frac{5}{x}\right) \div \frac{6x^2}{25}$