

## ADDITIONAL EXERCISES

Determine the value or values of the variables for which the expression is defined.

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

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

$$3. \frac{x^2+5x-36}{x^2+7x+6}$$

$$4. \frac{64x^2-25}{-8x^2-10x}$$

$$5. \frac{x^2+5x-36}{x^2-8x+12}$$

$$6. \frac{16x^2-9}{-9x^2-10x}$$

Simplify

$$7. \frac{9f+fg}{4f}$$

$$8. \frac{5p+pq}{8p}$$

$$9. \frac{4f+fg}{7f}$$

$$10. \frac{12x-24}{8-4x}$$

$$11. \frac{6x-24}{12-3x}$$

$$12. \frac{x^2+2x-35}{5-x}$$

$$13. \frac{x^2-5x-14}{7-x}$$

$$14. \frac{x^2-5x-14}{x^2-49}$$

$$15. \frac{u-1}{u^2-1}$$

$$16. \frac{x^2-x-12}{x^2-16}$$

$$17. \frac{j+8}{j^2-64}$$

$$18. \frac{x^2+5x-14}{2-x}$$

$$19. \frac{x^2+7x-18}{x^2-4}$$

$$20. \frac{x^2-9}{27-x^3}$$

## MULTIPLYING & DIVIDING RATIONAL EXPRESSIONS PRACTICE

Multiply and simplify.

1.  $\frac{5y^2}{3} \cdot \frac{9x}{10y}$

2.  $\frac{2x^3y}{3z^4} \cdot \frac{6xz^5}{10y^5}$

3.  $\frac{9y^2}{8} \cdot \frac{32x}{27y}$

4.  $\frac{2x^2y}{3z^3} \cdot \frac{12xz^4}{6y^3}$

5.  $\frac{3y^2}{5} \cdot \frac{10x}{15y}$

6.  $\frac{4x^2y}{2z^2} \cdot \frac{6xz^3}{20y^4}$

7.  $\frac{x+4}{3x+4y} \cdot \frac{9x^2-16y^2}{2x^2+3x-20}$

8.  $\frac{a^2-10a+21}{a-7} \cdot \frac{a^2+a-12}{(a-3)^2}$

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

10.  $\frac{a^2-6a+9}{a-3} \cdot \frac{a^2+3a-18}{(a-3)^2}$

11.  $\frac{5x^2}{3t^2} \cdot \frac{9t^8}{25x}$

12.  $\frac{7a^3}{10b^7} \cdot \frac{5b^3}{3a}$

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

14.  $\frac{5t^3}{4t-8} \cdot \frac{6t-12}{10t}$

15.  $\frac{y^2-16}{2y+6} \cdot \frac{y+3}{y-4}$

16.  $\frac{m^2-n^2}{4m+4n} \cdot \frac{m+n}{m-n}$

17.  $\frac{x^2-16}{x^2} \cdot \frac{x^2-4x}{x^2-x-12}$

18.  $\frac{y^2+10y+25}{y^2-9} \cdot \frac{y^2+3y}{y+5}$

19.  $\frac{6-2t}{t^2+4t+4} \cdot \frac{t^3+2t^2}{t^8-9t^6}$

20.  $\frac{x^2-6x+9}{12-4x} \cdot \frac{x^6-9x^4}{x^3-3x^2}$

21.  $\frac{x^2-2x-35}{2x^3-3x^2} \cdot \frac{4x^3-9x}{7x-49}$

22.  $\frac{y^2-10y+9}{y^2-1} \cdot \frac{y+4}{y^2-5y-36}$

23.  $\frac{c^3+8}{c^5-4c^3} \cdot \frac{c^6-4c^5+4c^4}{c^2-2c+4}$

24.  $\frac{x^3-27}{x^4-9x^2} \cdot \frac{x^5-6x^4+9x^3}{x^2+3x+9}$

25.  $\frac{a^3-b^3}{3a^2+9ab+6b^2} \cdot \frac{a^2+2ab+b^2}{a^2-b^2}$

26.  $\frac{x^3+y^3}{x^2+2xy-3y^2} \cdot \frac{x^2-y^2}{3x^2+6xy+3y^2}$

27.  $\frac{4x^2-9y^2}{8x^3-27y^3} \cdot \frac{4x^2+6xy+9y^2}{4x^2+12xy+9y^2}$

28.  $\frac{3x^2-3y^2}{27x^3-8y^3} \cdot \frac{6x^2+5xy-6y^2}{6x^2+12xy+6y^2}$

Divide and simplify.

29.  $28p^2q^4 \div \frac{4pq^4}{5r}$

30.  $\frac{r^3s}{t} \div \frac{rs^3}{t^3}$

31.  $24e^2d^4 \div \frac{3cd^4}{5f}$

32.  $\frac{u^5x}{y} \div \frac{ux^2}{y^4}$

33.  $\frac{m^5n}{p} \div \frac{mn^3}{p^4}$

34.  $\frac{3x^2+4x+1}{3x^2-5x-2} \div \frac{x^2-2x-3}{-5x^2+25x-30}$

35.  $\frac{2x^2+5x+3}{2x^2+7x+6} \div \frac{x^2+6x+5}{-5x^2-35x-50}$

36.  $\frac{30}{y^2+4y-12} \div \frac{6y}{y-2}$

37.  $\frac{15}{y^2+2y-8} \div \frac{5y}{y-2}$

38.  $\frac{x^2+3x-28}{x^2+4x+4} \div \frac{x^2-49}{x^2-5x-14}$

39.  $\frac{16a^7}{3b^5} \div \frac{8a^3}{6b}$

40.  $\frac{9x^5}{8y^2} \div \frac{3x}{16y^9}$

41.  $\frac{3y+15}{y^7} \div \frac{y+5}{y^2}$

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

$$43. \frac{y^2-9}{y^2} \div \frac{y^5+3y^4}{y+2}$$

$$44. \frac{x^2-4}{x^3} \div \frac{x^5-2x^4}{x+4}$$

$$45. \frac{4a^2-1}{a^2-4} \div \frac{2a-1}{a-2}$$

$$46. \frac{25x^2-4}{x^2-9} \div \frac{5x-2}{x+3}$$

$$47. \frac{x^2-y^2}{4x+4y} \div \frac{3y-3x}{12x^2}$$

$$48. \frac{5y-5x}{15y^3} \div \frac{x^2-y^2}{3x+3y}$$

$$49. \frac{x^2-16}{x^2-10x+25} \div \frac{3x-12}{x^2-3x-10}$$

$$50. \frac{y^2-36}{y^2-8y+16} \div \frac{3y-18}{y^2-y-12}$$

$$51. \frac{y^3+3y}{y^2-9} \div \frac{y^2+5y-14}{y^2+4y-21}$$

$$52. \frac{a^3+4a}{a^2-16} \div \frac{a^2+8a+15}{a^2+a-20}$$

$$53. \frac{x^3-64}{x^3+64} \div \frac{x^2-16}{x^2-4x+16}$$

$$54. \frac{8y^3-27}{64y^3-1} \div \frac{4y^2-9}{16y^2+4y+1}$$

$$55. \frac{8a^3+b^3}{2a^2+3ab+b^2} \div \frac{8a^2-4ab+2b^2}{4a^2+4ab+b^2}$$

$$56. \frac{x^3+8y^3}{2x^2+5xy+2y^2} \div \frac{x^3-2x^2y+4xy^2}{8x^2-2y^2}$$