



In this worksheet you will develop your skills in differentiating quotients of functions by applying the quotient rule. Each question requires you to differentiate a given function by carefully applying the quotient rule. Remember the quotient rule for differentiating a function of the form  $\frac{u(x)}{v(x)}$  is

$$\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}.$$

## Easy Questions

1. Differentiate  $f(x) = \frac{x+3}{x-2}$ .
2. Differentiate  $f(x) = \frac{2x}{x+1}$ .
3. Differentiate  $f(x) = \frac{x^2}{x}$ .
4. Differentiate  $f(x) = \frac{3}{x}$ .
5. Differentiate  $f(x) = \frac{x+1}{2x}$ .

## Intermediate Questions

6. Differentiate  $f(x) = \frac{x^2+1}{x-3}$ .
7. Differentiate  $f(x) = \frac{3x^2-2x+1}{2x+5}$ .
8. Differentiate  $f(x) = \frac{2x^3-x}{x^2+1}$ .
9. Differentiate  $f(x) = \frac{x^2-1}{x^2+1}$ .
10. Differentiate  $f(x) = \frac{4x+1}{3x-2}$ .
11. Differentiate  $f(x) = \frac{x^3+2x}{x-1}$ .

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

13. Differentiate  $f(x) = \frac{3x}{x^2+2}$ .

14. Differentiate  $f(x) = \frac{x^2+2x+1}{x+3}$ .

15. Differentiate  $f(x) = \frac{2x^2+3}{3x}$ .

16. Differentiate  $f(x) = \frac{x^2+4x+4}{x^2-4}$ .

17. Differentiate  $f(x) = \frac{3x^2+5x-2}{x+2}$ .

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

19. Differentiate  $f(x) = \frac{x^2+6}{2x+3}$ .

20. Differentiate  $f(x) = \frac{5x+4}{x^2+1}$ .

## Hard Questions

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

22. Differentiate  $f(x) = \frac{3x^3+2x^2-x+4}{x^2+2x-3}$ .

23. Differentiate  $f(x) = \frac{2x^3-5x^2+4x-1}{x^3+x}$ .

24. Differentiate  $f(x) = \frac{x^3+3x^2+3x+1}{x+1}$ .

25. Differentiate  $f(x) = \frac{4x^3-x+7}{2x^2-3}$ .

26. Differentiate  $f(x) = \frac{x^4+5x^2+6}{x^2-2x}$ .

27. Differentiate  $f(x) = \frac{3x^3-x^2+2x-5}{x^2+4}$ .

28. Differentiate  $f(x) = \frac{2x^4-x^3+x-1}{x^3-x}$ .

29. Differentiate  $f(x) = \frac{x^3+2x^2-x+1}{x^2+x+1}$ .

30. Differentiate  $f(x) = \frac{5x^4 - 3x^2 + x - 6}{2x^3 + x - 1}$ .