

Rewriting functions to use the chain rule

Examples

1.  $y = (6x - 5)^4$

2.  $y = \frac{1}{\sqrt{x+1}}$

3.  $y = \sqrt{x^2 - 1}$

$$y = \frac{1}{\sqrt{4x+2}}$$

$$y = \frac{x}{(3x+4)^4}$$

23.  $y = \frac{1}{\sqrt{x+2}}$

24.  $g(t) = \sqrt{\frac{1}{t^2 - 2}}$

27.  $y = x\sqrt{1 - x^2}$

28.  $y = \frac{1}{2}x^2\sqrt{16 - x^2}$

29.  $y = \frac{x}{\sqrt{x^2 + 1}}$

30.  $y = \frac{x}{\sqrt{x^4 + 4}}$

$$33. f(v) = \left(\frac{1-2v}{1+v}\right)^3$$

$$34. g(x) = \left(\frac{3x^2-2}{2x+3}\right)^3$$

$$13. f(t) = \sqrt{1-t}$$

$$14. g(x) = \sqrt{5-3x}$$

$$15. y = \sqrt[3]{9x^2+4}$$

$$16. g(x) = \sqrt{x^2-2x+1}$$

$$17. y = 2\sqrt[4]{4-x^2}$$

$$18. f(x) = -3\sqrt[4]{2-9x}$$

$$19. y = \frac{1}{x-2}$$

$$20. s(t) = \frac{1}{t^2+3t-1}$$

Find the derivative:

$$21. f(t) = \left(\frac{1}{t-3}\right)^2$$

$$2 \left(\frac{1}{t-3}\right) \cdot \left(\frac{(t-3) \cdot 0 - 1(1)}{(t-3)^2}\right)$$

OR

$$23. y = \frac{1}{\sqrt{x+2}} = (x+2)^{-1/2}$$

$$-\frac{1}{2}(x+2)^{-3/2} (1)$$

$$25. f(x) = x^2(x-2)^4$$

$$2x(x-2)^4 + x^2(4)(x-2)^3$$

$$27. y = x\sqrt{1-x^2} = x(1-x^2)^{1/2}$$

$$1(1-x^2)^{1/2} + x\left(\frac{1}{2}\right)(1-x^2)^{-1/2}(-2x)$$

$$29. y = \frac{x}{\sqrt{x^2+1}}$$

$$\frac{\sqrt{x^2+1}(1) - x\left(\frac{1}{2}\right)(x^2+1)^{-1/2}(2x)}{(x^2+1)}$$

$$31. g(x) = \left(\frac{x+5}{x^2+2}\right)^2$$

$$2\left(\frac{x+5}{x^2+2}\right) \cdot \left(\frac{(x^2+2)(1) - (x+5)(2x)}{(x^2+2)^2}\right)$$

$$33. f(v) = \left(\frac{1-2v}{1+v}\right)^3$$

$$3\left(\frac{1-2v}{1+v}\right)^2 \cdot \left(\frac{(1+v)(-2) - (1-2v)(1)}{(1+v)^2}\right)$$

$$22. y = -\frac{5}{(t+3)^3}$$

$$-5(t+3)^{-3}$$

$$15(t+3)^{-4}(1)$$

$$24. g(t) = \sqrt{\frac{1}{t^2-2}}$$

$$(t^2-2)^{-1/2}$$

$$-\frac{1}{2}(t^2-2)^{-3/2}(2t)$$

$$26. f(x) = x(3x-9)^3$$

$$1(3x-9)^3 + x \cdot 3(3x-9)^2(3)$$

$$28. y = \frac{1}{2}x^2\sqrt{16-x^2}$$

$$1x\sqrt{16-x^2} + \frac{1}{2}x^2\left(\frac{1}{2}\right)(16-x^2)^{-1/2}(-2x)$$

$$30. y = \frac{x}{\sqrt{x^4+4}}$$

$$x(x^4+4)^{-1/2}$$

$$1(x^4+4)^{-1/2} + x\left(-\frac{1}{2}\right)(x^4+4)^{-3/2}(4x)$$

$$32. h(t) = \left(\frac{t^2}{t^3+2}\right)^2$$

$$2\left(\frac{t^2}{t^3+2}\right) \cdot \left(\frac{(t^3+2)(2t) - t^2(3t^2)}{(t^3+2)^2}\right)$$

$$34. g(x) = \left(\frac{3x^2-2}{2x+3}\right)^3$$

$$3\left(\frac{3x^2-2}{2x+3}\right)^2 \cdot \left(\frac{(2x+3)(6x) - (3x^2-2)(2)}{(2x+3)^2}\right)$$