

Part 3

Derivatives

Question 3.1. Find the derivative of the function.

$$y = \frac{1}{18}(3x - 2)^6 + \left(4 - \frac{1}{2x^2}\right)^{-1}$$

Question 3.2. Find the derivative of the function.

$$y = (2x - 5)^{-1}(x^2 - 5x)^6$$

Question 3.3. Find the derivative of the function.

$$y = (9x^2 - 6x + 2)e^{x^3}$$

Question 3.4. Find the derivative of the function.

$$h(x) = x \tan(2\sqrt{x}) + 7$$

Question 3.5. Find the derivative of the function.

$$k(x) = x^2 \sec\left(\frac{1}{x}\right)$$

Question 3.6. Find the derivative of the function.

$$f(x) = \sqrt{7 + x \sec x}$$

Question 3.7. Find the derivative of the function.

$$g(x) = \frac{\tan 3x}{(x + 7)^4}$$

Question 3.8. Find the derivative of the function.

$$y = 2 \ln(\sin x)$$

Question 3.9. Find the derivative of the function.

$$y = \ln(x^3) - (\ln x)^3$$

Question 3.10. Find the derivative of the function.

$$y = \frac{x^4}{4} \ln x - \frac{x^4}{16}$$

Question 3.11. Find the derivative of the function.

$$y = \sin^{-1}(1 - t)$$

Question 3.12. Find the derivative of the function.

$$y = \ln(\tan^{-1} x)$$

Question 3.13. Find the derivative of the function.

$$y = \tan^{-1}(\ln x)$$

Question 3.14. Find the derivative of the function.

$$y = \ln(x^2 + 4) - x \tan^{-1}\left(\frac{x}{2}\right)$$

Question 3.15. The following implicitly defines y as a function of x .
Find dy/dx .

$$x^2y + xy^2 = 6$$

Question 3.16. The following implicitly defines y as a function of x .
Find dy/dx .

$$x^3 + y^3 = 18xy$$

Question 3.17. The following implicitly defines y as a function of x .
Find dy/dx .

$$x = \sec y$$