

Practice for assessment: Methods in Algebra and Calculus
Methods in Algebra and Calculus Standard 1.2

1. Differentiate the following with respect to x .

(a) $f(x) = e^{2x-1}$

(b) $f(x) = e^{\sin x}$

(c) $f(x) = \ln(\sin 2x)$

2. Given $y = \tan^2 3x$, find $\frac{dy}{dx}$

3. Differentiate the following with respect to x .

(a) $f(x) = 5x^3 \sin x$

(b) $h(x) = \frac{x^2+x}{4x-1} \quad x \neq \frac{1}{4}$

4. Differentiate the following with respect to x .

(a) $f(x) = 4\sin^{-1}(2x) \quad -\frac{1}{2} \leq x \leq \frac{1}{2}$

(b) $g(x) = \tan^{-1}(4x)$

5. Use logarithmic differentiation to find $f'(x)$ for

(a) $f(x) = 4^{3x}$

(b) $g(x) = x e^{-x} \cos x$

6. If $x^2 - xy + 3y^2 = 10$ use implicit differentiation to find $\frac{dy}{dx}$

7. A curve is given by the parametric equations $x = t^2 + t$ and $y = 2t^4$
Find $\frac{dy}{dx}$ when $t = 3$

8. A particle moves according to the equation $x = 4t^2 - 6t$
Find the velocity and acceleration after 2 seconds.