

AH Differentiation Homework (1)

1. Find the derivative of $f(x) = 2x^2$ from first principles. (4)

2. Differentiate the following functions with respect to x .

(a) $y = \frac{1}{(x^2+3x+5)^2}$ (b) $y = \sin^2\left(2x - \frac{\pi}{6}\right)$ (3, 4)

3. Given $f(x) = x^3 \cos 2x$ obtain $f'(x)$. (3)

4. Differentiate the following using the quotient rule.

(a) $f(x) = \frac{x^2}{2x+3}$ (b) $f(x) = \frac{\sin x}{x^2}$ (3, 3)

5. Differentiate $g(x) = \frac{\sin x}{1+\cos x}$, $-\pi < x < \pi$, (5)

And simplify your answer.

Total = 25 marks