

Differentiation Questions

(b) Given that $y = \frac{3x+1}{2x+1}$, show that $\frac{dy}{dx} = \frac{1}{(2x+1)^2}$. (3 marks)

2 (a) Find $\frac{dy}{dx}$ when $y = (3x-1)^{10}$. (2 marks)

6 (a) Find $\frac{dy}{dx}$ when:

(i) $y = (4x^2 + 3x + 2)^{10}$; (2 marks)

2 (a) Differentiate $(x-1)^4$ with respect to x . (1 mark)

Why so short?

Because the techniques learnt are embedded and checked in questions on other topics.

Differentiation Answers

<p>(b) $\frac{dy}{dx} = \frac{(2x+1)3 - 2(3x+1)}{(2x+1)^2} = \frac{6x+3-6x-2}{(2x+1)^2}$</p> <p>$= \frac{1}{(2x+1)^2}$</p> <p>Alternative</p> <p>$-2(3x+1)(2x+1)^{-2} + 3(2x+1)^{-1}$</p> <p style="text-align: right;">(M1A1)</p> <p>$= \frac{1}{(2x+1)^2}$</p> <p style="text-align: right;">(A1)</p>	<p>M1</p> <p>A1</p> <p>A1</p>	<p>3</p>	<p>use of quotient rule</p> <p>AG (no errors)</p> <p>Alternative:</p> <p>$y = \frac{3}{2} - \frac{1}{2}(2x+1)^{-1}$ M1A1</p> <p>$\frac{dy}{dx} = (2x+1)^{-2}$ A1</p> <p>$= \frac{1}{(2x+1)^2}$ AG</p>
<p>2(a) $y = (3x-1)^{10}$</p> <p>$\frac{dy}{dx} = 10(3x-1)^9 \times 3$</p> <p>$= 30(3x-1)^9$</p>	<p>M1 A1</p>	<p>2</p>	<p>M1 for $a(3x-1)^9$ where $a = \text{constant}$</p>
<p>6(a)(i) $y = (4x^2 + 3x + 2)^{10}$</p> <p>$\frac{dy}{dx} = 10(4x^2 + 3x + 2)^9(8x + 3)$</p>	<p>M1</p> <p>A1</p>	<p>2</p>	<p>For $f(x)()^9$ where $f(x) \neq k$ and is linear</p>
<p>2(a) $4(x-1)^3$ or in expanded form</p>	<p>B1</p>	<p>1</p>	<p>allow $-4(1-x)^3$</p>

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