

1.5 Answers

A-Level Pure Mathematics : Year 2

Differentiation III

1.5.1 Solution to 1.2 Example (Teaching Video)

$$y = (4x + 5)^2$$
$$\frac{dy}{dx} = 2(4x + 5)^1 \times 4$$
$$\frac{dy}{dx} = 8(4x + 5)$$

1.5.2 Solutions to 1.4 Exercise)

Answer 1

$$\frac{dy}{dx} = 30x(5x^2 + 7)^2$$

[2 marks]

Answer 2

$$\frac{dy}{dx} = -300x(11 - 6x^2)^4$$

[2 marks]

Answer 3

$$\frac{dy}{dx} = -\frac{5}{2}(9 - 5x)^{-\frac{1}{2}}$$

or

$$\frac{dy}{dx} = -\frac{5}{2\sqrt{9 - 5x}}$$

[2 marks]

Answer 4

$$f'(x) = 84(9 + 14x)^{\frac{1}{2}}$$

or

$$f'(x) = 84\sqrt{9 + 14x}$$

[2 marks]

Answer 5

$$f'(x) = -105(7x + 8)^{-4}$$

or

$$f'(x) = -\frac{105}{(7x + 8)^4}$$

[3 marks]

Answer 6

$$\frac{dy}{dx} = \frac{50}{3} (7 - 2x)^{-6}$$

or

$$\frac{dy}{dx} = \frac{50}{3 (7 - 2x)^6}$$

[3 marks]

Answer 7

$$\frac{dy}{dx} = - \frac{6x}{(3x^2 + 2)^2}$$

[3 marks]

Answer 8

$$\frac{dy}{dx} = 8(2x - 3)^3$$

When $x = 2$, this gives,

$$\frac{dy}{dx} = 8$$

Thus,

$$y = 8x - 15$$

[3 marks]

Answer 9

(a) $\frac{dy}{dx} = 3(x + 3)^2 - 4$

So, need to solve, $\frac{dy}{dx} = 8$

Which gives the two solutions, $(-5, 0)$, $(-1, 0)$

[3 marks]

(b) $(-2, 0), (2, 0)$

[3 marks]

(c) The first pair of answers is the second pair translated by $\begin{pmatrix} -3 \\ 0 \end{pmatrix}$

[1 mark]

Answer 10

(a) $x + 3y - 4 = 0$

[4 marks]

(b) $9x - 3y - 26 = 0$

[4 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from MHHShrewsbury@Gmail.com