Differentiation

Grade 8 | Higher | 10 questions, 32 marks

GCSE Maths topic practice

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Name: _____ **Date:** _____ **Score:** _____ **/ 32**

1 $y = x^3 + 4x^2 - 7x + 2$

Find $\frac{dy}{dx}$

(2 marks)

Answer _____

2 $f(x) = 5x^4 - 2x^2 + 9$

a. Find $f'(x)$

b. Work out the value of $f'(-1)$

(3 marks)

Answer _____

3 The point P $(4, -7)$ lies on the curve with equation $y = x^2 - 6x + 1$

Find the gradient of the curve at P.

(2 marks)

Answer _____

4 $y = \frac{6}{x} + x^2$

a. Find $\frac{dy}{dx}$

b. Find the gradient of the curve at the point where $x = 2$

(3 marks)

Answer _____

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5 $y = \frac{4}{x^2} + x$

a. Find $\frac{dy}{dx}$

b. Find the gradient of the curve at the point where $x = -1$

(3 marks)

Answer _____

6 A curve has equation $y = x^3 - 3x^2 + 5x$

Find the x-coordinates of the points on the curve where the gradient is 5.

(3 marks)

Answer _____

7 The curve with equation $y = x^2 - 8x + 3$ has exactly one point where the gradient is zero.

Find the coordinates of this point.

(3 marks)

Answer _____

8 Water flows into a tank. The volume of water in the tank, V litres, t minutes after the water starts to flow is given by

$V = 20t + 6t^2 - t^3$ for $0 \leq t \leq 5$

a. Find $\frac{dV}{dt}$

b. Work out the value of $\frac{dV}{dt}$ when $t = 3$

c. Explain, in context, what your answer to part (b) tells you.

(4 marks)

Answer _____

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9 The curve C has equation $y = x^3 - 2x + 1$

Find the equation of the tangent to C at the point where $x = 2$

Give your answer in the form $y = mx + c$

(4 marks)

Answer _____

10 The curve C has equation $y = x(x - 3)^2$

a. Find $\frac{dy}{dx}$

b. Find the equation of the tangent to C at the point where $x = 4$

Give your answer in the form $y = mx + c$

(5 marks)

Answer _____

End of questions | Total 32 marks

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