Calculus

Question Paper 2

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Topic	Sequences, Functions and Graphs
Sub Topic	Calculus
Booklet	Question Paper 2

Time Allowed: **54 minutes**

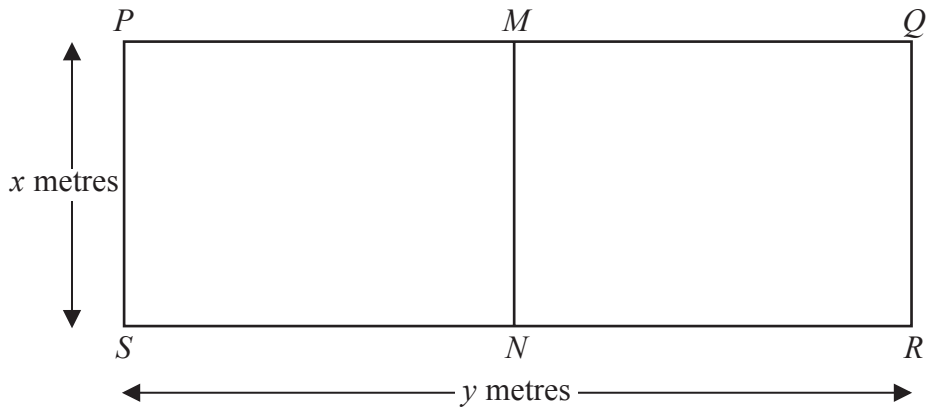
Score: **/45**

Percentage: **/100**

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>90%	80%	70%	60%	50%	40%	30%	20%	10%

1 A farmer has 120 metres of fencing.
He is going to make a rectangular enclosure $PQRS$ with the fencing.
He is also going to divide the enclosure into two equal parts by fencing along MN.



The width of the enclosure is x metres.
The length of the enclosure is y metres.

(a) (i) Show that $y = 60 - 1.5x$

The area of the enclosure $PQRS$ is A m^2

(ii) S that $A = 60x - 1.5x^2$

(3)

(b) Find $\dfrac{\mathrm{d}A}{\mathrm{d}x}$

.....

(2)

(c) Find the maximum value of A.

$A =$ .....

(3)

(Total for Question 1 is 8 marks)

2 For the curve with equation $y = 4x^3 - 2x + 5$

(i) find $\frac{dy}{dx}$

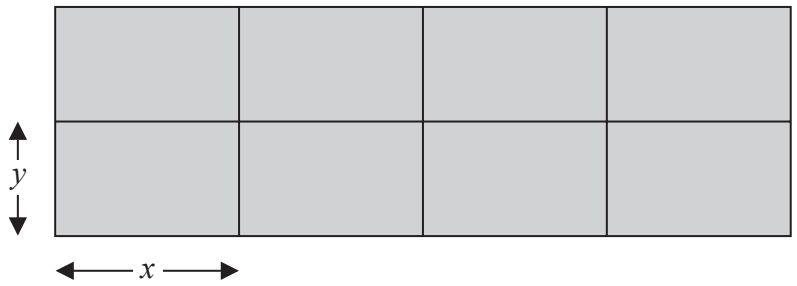
.....

(ii) find the coordinates of the two points on the curve where the gradient of the curve is 1

(..... , ...) and (..... , ...)

(Total for Question 2 is 6 marks)

3 A farmer has 180 metres of fencing.
With the 180 metres of fencing, he makes an enclosure divided into eight equal, rectangular pens.
The fencing is used for the perimeter of each pen.



The length of each pen is x metres and the width of each pen is y metres.

(a) (i) Show that $y = 18 - 1.2x$

The total area of the enclosure is A m^2.

(ii) Show that $A = 144x - 9.6x^2$

(3)

(b) Find $\frac{dA}{dx}$

.....

(2)

(c) Find the maximum value of A.

$A =$.....

(3)

(Total for Question 3 is 8 marks)

4 (a) $y = 2x^3 + 3x^2 + 2$

Find $\frac{dy}{dx}$

.....

(2)

(b) The point P lies on the curve with equation $y = 2x^3 + 3x^2 + 2$

The gradient of the curve at P is $-\frac{3}{2}$

Find the coordinates of P.

(..... , ...)

(5)

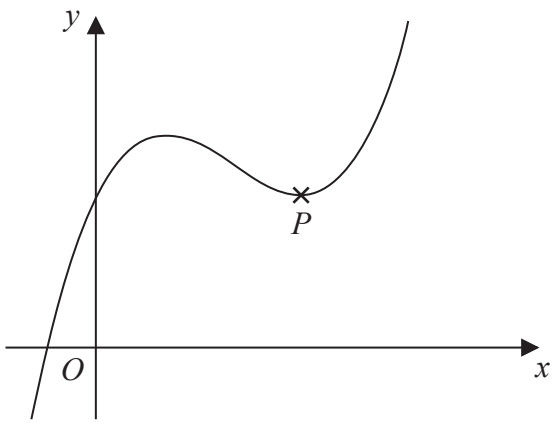
(Total for Question 4 is 7 marks)

5 $y = x^3 - 4x^2 + 4x + 3$

(a) Find $\frac{dy}{dx}$

.....

(2)



The diagram shows a sketch of the curve with equation $y = x^3 - 4x^2 + 4x + 3$
The point P is a turning point on the curve.

(b) Work out the coordinates of P.
Show clear algebraic working.

(..... , ...)

(4)

(c) Write down the range of values of x for which the curve has a negative gradient.

.....

(2)

(Total for Question 5 is 8 marks)

6

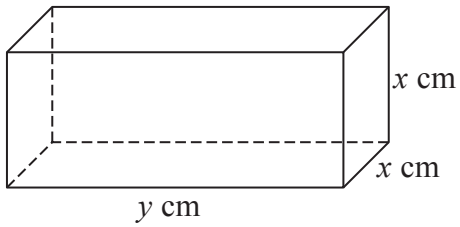


Diagram **NOT** accurately drawn

The diagram shows a cuboid of volume V cm^3
The length of the cuboid is y cm
The width and height of the cuboid are both x cm

The total length of all the edges of the cuboid is 112 cm

(a) Show that $V = 28x^2 - 2x^3$

(3)

(b) Find $\frac{dV}{dx}$

$\frac{dV}{dx} =$ .....

(2)

(c) Find the maximum value of V
Give your answer correct to 3 significant figures.

$V =$ .....

(3)

(Total for Question 6 is 8 marks)