A11 Algebra exam review

1 a For the equation $y = 5000x - 625x^2$, find $\frac{dy}{dx}$.

.....

(2)

b Find the coordinates of the turning point on the graph of $y = 5000x - 625x^2$.

(....., ...)

(3)

c i State whether this turning point is a maximum or a mininum.

.....

ii Give a reason for your answer.

.....

.....

(2)

d A publisher has to set the price for a new book.
The profit, £y, depends on the price of the book, £x, where

$$y = 5000x - 625x^2$$

i What price would you advise the publisher to set for the book?

£ .....

ii Give a reason for your answer.

.....

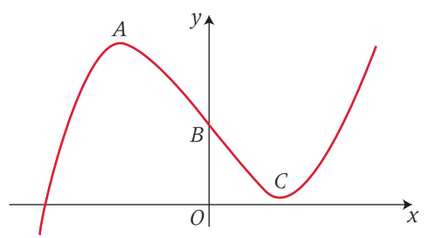
.....

(2)

(Total 9 marks)

2 The diagram shows the graph of $y = x^3 - 12x + 17$

A is the maximum point on the curve.
C is the minimum point on the curve.
The curve crosses the y axis at B.



For the equation $y = x^3 - 12x + 17$

a find $\frac{dy}{dx}$,

.....

(2)

b find the gradient of the curve at B,

.....

(2)

c find the coordinates of A and C.

A (....., ...)

C (....., ...)

(4)

(Total 8 marks)

3 A particle moves along a line.
For $t \geqslant 1$, the distance of the particle from O at time t second is x metres, where

$$x = \frac{20}{t}$$

Find an expression for the acceleration of the particle.

..... m/s^2

(Total 3 marks)

4 A body is moving in a straight line which passes through a fixed point O.
The displacement, s metres, of the body from O at time t seconds is given by

$$s = t^3 + 4t^2 - 5t$$

a Find an expression for the velocity, v m/s, at time t seconds.

v = ...

(2)

b Find the acceleration after 2 seconds.

..... m/s^2

(2)

(Total 4 marks)

5 A farmer wants to make a rectangular pen for keeping sheep.
He uses a wall, *AB*, for one side.
For the other three sides, he uses 28 m of fencing.
He wants to make the area of the pen as large as possible.

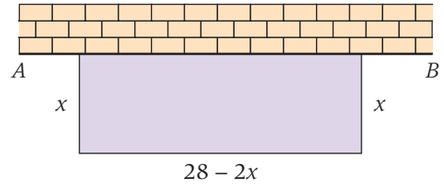


Diagram **NOT** accurately drawn

The width of the pen is x metres.
The length parallel to the wall is $(28 - 2x)$ metres.

a The area of the pen is y m^2.
Show that $y = 28x - 2x^2$.

(1)

b For $y = 28x - 2x^2$

i find $\frac{dy}{dx}$,

.....

ii find the value of x for which y is a maximum.

$x =$ .....

iii Explain how you know that this value gives a maximum.

.....

.....

(5)

c Find the largest possible area of the pen.

.....m^2

(2)

(Total 8 marks)