

Additional Mathematics

Grade Gobbler 4

40 Mark Paper

Question 1

A straight line passes through the points (2, 5) and (8, 2)

(i) Find the equation of this line in the form $y = m x + c$

[2 marks]

A second straight line passes through the y-axis at (0, 4)

It is also perpendicular to the first line.

(ii) Find the equation of this second line, also in the form $y = m x + c$

[2 marks]

Question 2

The gradient of a curve is given by;

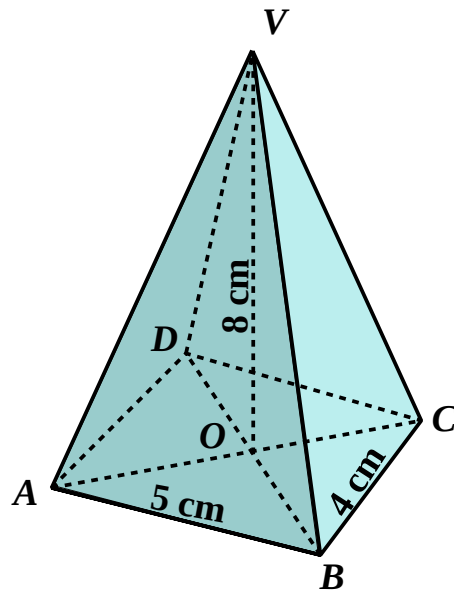
$$\frac{dy}{dx} = 4 + x - 3x^2$$

Find the equation of the curve given that it passes through the point (2, 5)

[4 marks]

Question 3

A pyramid $ABCDV$ has a rectangular, horizontal, base $ABCD$ of sides 5 cm and 4 cm. The vertex V , is vertically above the centre of the base O . The pyramid has height 8 cm.



Find the angle VAC .

[4 marks]

Question 4

Write the following as a single fraction in as simple a form as possible;

$$\frac{1}{(1 + \sqrt{x})} + \frac{1}{(1 - \sqrt{x})}$$

[4 marks]

Question 5

$$f(x) = x^3 - 5x^2 + 3x + 9$$

- (i) Factorise $f(x)$ completely.

Hint : The factor theorem may help you get started.

[5 marks]

- (ii) Hence, or otherwise, solve the equation $f(x) = 0$

[2 marks]

Question 6

Find the four values of θ in the range $0^\circ \leq \theta \leq 360^\circ$ that satisfy the equation;

$$\cos 2\theta = 0.413$$

[5 marks]

Question 7

Expand the brackets, simplifying each term,

$$\left(x + \frac{5}{x} \right)^3$$

[4 marks]

Question 8

- (i) Show that the point (2, 6) lies on the curve with equation

$$y = x^3 - x$$

[1 mark]

- (ii) Find the equation of the tangent to the curve at the point (2, 6)

[3 marks]

- (iii) Where does this tangent again meet the curve ?

[4 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from mhh@shrewsbury.org.uk