

2. Solve the simultaneous equations

$$\begin{aligned}y - 2x - 4 &= 0 \\4x^2 + y^2 + 20x &= 0\end{aligned}$$

(7)



4. (i) A sequence U_1, U_2, U_3, \dots is defined by

$$U_{n+2} = 2U_{n+1} - U_n, \quad n \geq 1$$

$$U_1 = 4 \text{ and } U_2 = 4$$

Find the value of

(a) U_3

(1)

(b) $\sum_{n=1}^{20} U_n$

(2)

(ii) Another sequence V_1, V_2, V_3, \dots is defined by

$$V_{n+2} = 2V_{n+1} - V_n, \quad n \geq 1$$

$$V_1 = k \text{ and } V_2 = 2k, \text{ where } k \text{ is a constant}$$

(a) Find V_3 and V_4 in terms of k .

(2)

Given that $\sum_{n=1}^5 V_n = 165,$

(b) find the value of k .

(3)



Question 6 continued

Lined area for writing the answer to Question 6 continued. The area consists of 27 horizontal lines spaced evenly down the page.



8. (a) Factorise completely $9x - 4x^3$ (3)

(b) Sketch the curve C with equation

$$y = 9x - 4x^3$$

Show on your sketch the coordinates at which the curve meets the x -axis. (3)

The points A and B lie on C and have x coordinates of -2 and 1 respectively.

(c) Show that the length of AB is $k\sqrt{10}$ where k is a constant to be found. (4)



