

(3)

1001

2. (a) Expand and simplify $(7 + \sqrt{5})(3 - \sqrt{5})$. (3)

(b) Express $\frac{7 + \sqrt{5}}{3 + \sqrt{5}}$ in the form $a + b\sqrt{5}$, where a and b are integers. (3)

Handwriting practice lines for the answer to question 2(b).

Q2

(Total 6 marks)



3. The line l_1 has equation $3x + 5y - 2 = 0$

(a) Find the gradient of l_1 .

(2)

The line l_2 is perpendicular to l_1 and passes through the point $(3, 1)$.

(b) Find the equation of l_2 in the form $y = mx + c$, where m and c are constants.

(3)

[illegible]

4. $\frac{dy}{dx} = 5x^{-\frac{1}{2}} + x\sqrt{x}, \quad x > 0$

Given that $y = 35$ at $x = 4$, find y in terms of x , giving each term in its simplest form. (7)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

6. The curve C has equation

$$y = \frac{(x+3)(x-8)}{x}, \quad x > 0$$

- (a) Find $\frac{dy}{dx}$ in its simplest form.

- (b) Find an equation of the tangent to C at the point where $x = 2$ (4)

[illegible]

- (b) Calculate the total amount of money she gave over the 20-year period. (3)

He gave £A in Year 1 and the amounts of money he gave each year increased, forming an arithmetic sequence with common difference £30.

(c) Calculate the value of A . (4)

This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.

(Total 9 marks)



8.

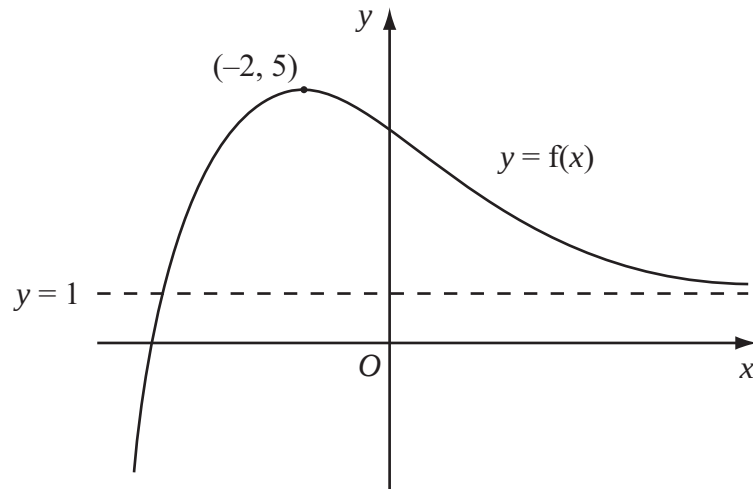


Figure 1

Figure 1 shows a sketch of part of the curve with equation $y = f(x)$.

The curve has a maximum point $(-2, 5)$ and an asymptote $y = 1$, as shown in Figure 1.

On separate diagrams, sketch the curve with equation

(a) $y = f(x) + 2$ (2)

(b) $y = 4f(x)$ (2)

(c) $y = f(x + 1)$ (3)

On each diagram, show clearly the coordinates of the maximum point and the equation of the asymptote.



Question 8 continued

Q8

(Total 7 marks)



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

showing the coordinates of the points at which the curve meets the x -axis. (3)

(c) Find an equation of the line which passes through A and B , giving your answer in the form $y = mx + c$, where m and c are constants.

(d) Show that the length of AB is $k\sqrt{10}$, where k is a constant to be found. (2)

This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal grey lines across its entire width, providing a template for writing or drawing. The margins are consistent on all sides.

[illegible]

(Total 10 marks)

TOTAL FOR PAPER: 75 MARKS

END

