







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)**

Area containing horizontal lines for student answers.

Leave blank

Q2

**(Total 6 marks)**





**Question 3 continued**

Leave blank

Handwritten area for the answer to Question 3, containing approximately 30 horizontal lines.

**Q3**

**(Total 5 marks)**

5

**Turn over**



Leave blank

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)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---





5. Solve the simultaneous equations

$$y - 3x + 2 = 0$$

$$y^2 - x - 6x^2 = 0$$

(7)

Leave  
blank







**Question 5 continued**

Leave  
blank

Lined area for writing the answer to Question 5.

**(Total 7 marks)**

**Q5**



N 3 4 8 5 4 A 0 9 2 8







Leave blank

7. Jill gave money to a charity over a 20-year period, from Year 1 to Year 20 inclusive. She gave £150 in Year 1, £160 in Year 2, £170 in Year 3, and so on, so that the amounts of money she gave each year formed an arithmetic sequence.

(a) Find the amount of money she gave in Year 10. (2)

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

Kevin also gave money to the charity over the same 20-year period.

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

The total amount of money that Kevin gave over the 20-year period was **twice** the total amount of money that Jill gave.

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

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---







**Question 7 continued**

Leave  
blank

Lined writing area for the question response.



**Question 7 continued**

Leave  
blank

Lined area for writing the answer to Question 7.

**(Total 9 marks)**

**Q7**

15

**Turn over**



Leave  
blank

8.

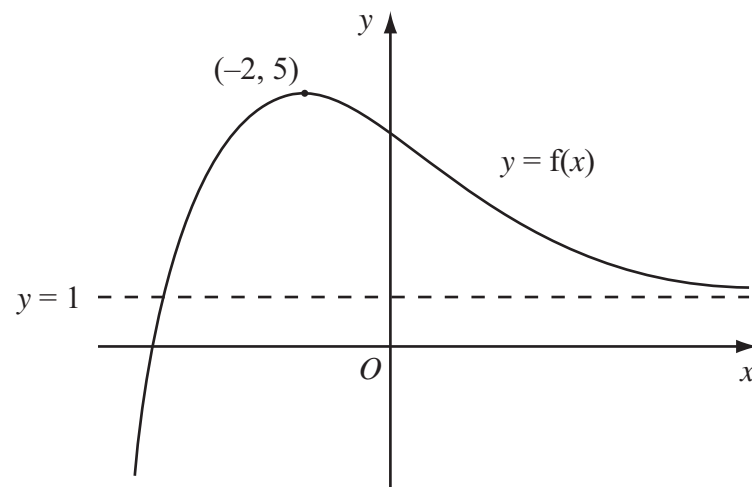


Figure 1

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.







<p><b>Question 8 continued</b></p>	<p>Leave blank</p>
------------------------------------	------------------------



N 3 4 8 5 4 A 0 1 7 2 8



**Question 8 continued**

Leave  
blank



**Question 8 continued**

Leave  
blank

**(Total 7 marks)**

**Q8**

19

**Turn over**











Leave blank

- 10.**  $f(x) = x^2 + 4kx + (3+11k)$ , where  $k$  is a constant.
- (a) Express  $f(x)$  in the form  $(x + p)^2 + q$ , where  $p$  and  $q$  are constants to be found in terms of  $k$ . (3)

Given that the equation  $f(x) = 0$  has no real roots,

- (b) find the set of possible values of  $k$ . (4)

Given that  $k = 1$ ,

- (c) sketch the graph of  $y = f(x)$ , showing the coordinates of any point at which the graph crosses a coordinate axis. (3)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---











**BLANK PAGE**

