



## Q1

1. Given that  $y = x^4 + x^{\frac{1}{3}} + 3$ , find  $\frac{dy}{dx}$ .

**(3)**

**(Total 3 marks)**



## Q2

**(3)**

(3)

**(Total 6 marks)**



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**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)**



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### Q3

11

**Turn over**



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)

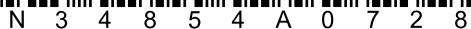
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**Q4**

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5. Solve the simultaneous equations

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

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

(7)

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### Q5

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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.

(4)

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

(4)



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**Q6**

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- (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.

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  $A$ .

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Question 7 continued

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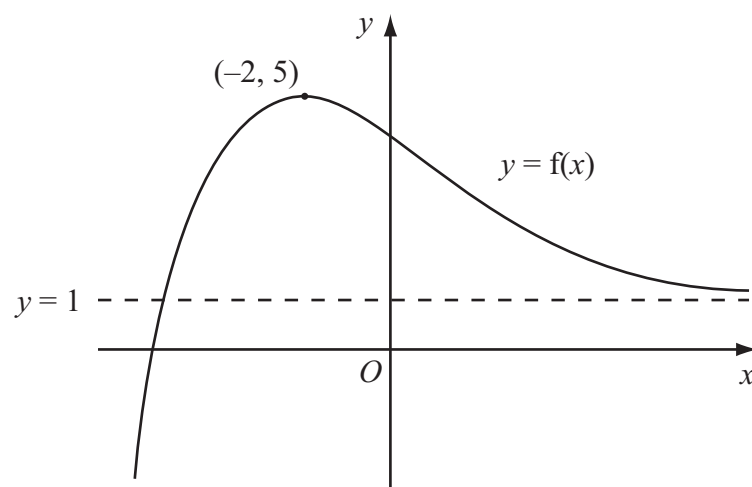
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**Q7**

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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.







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





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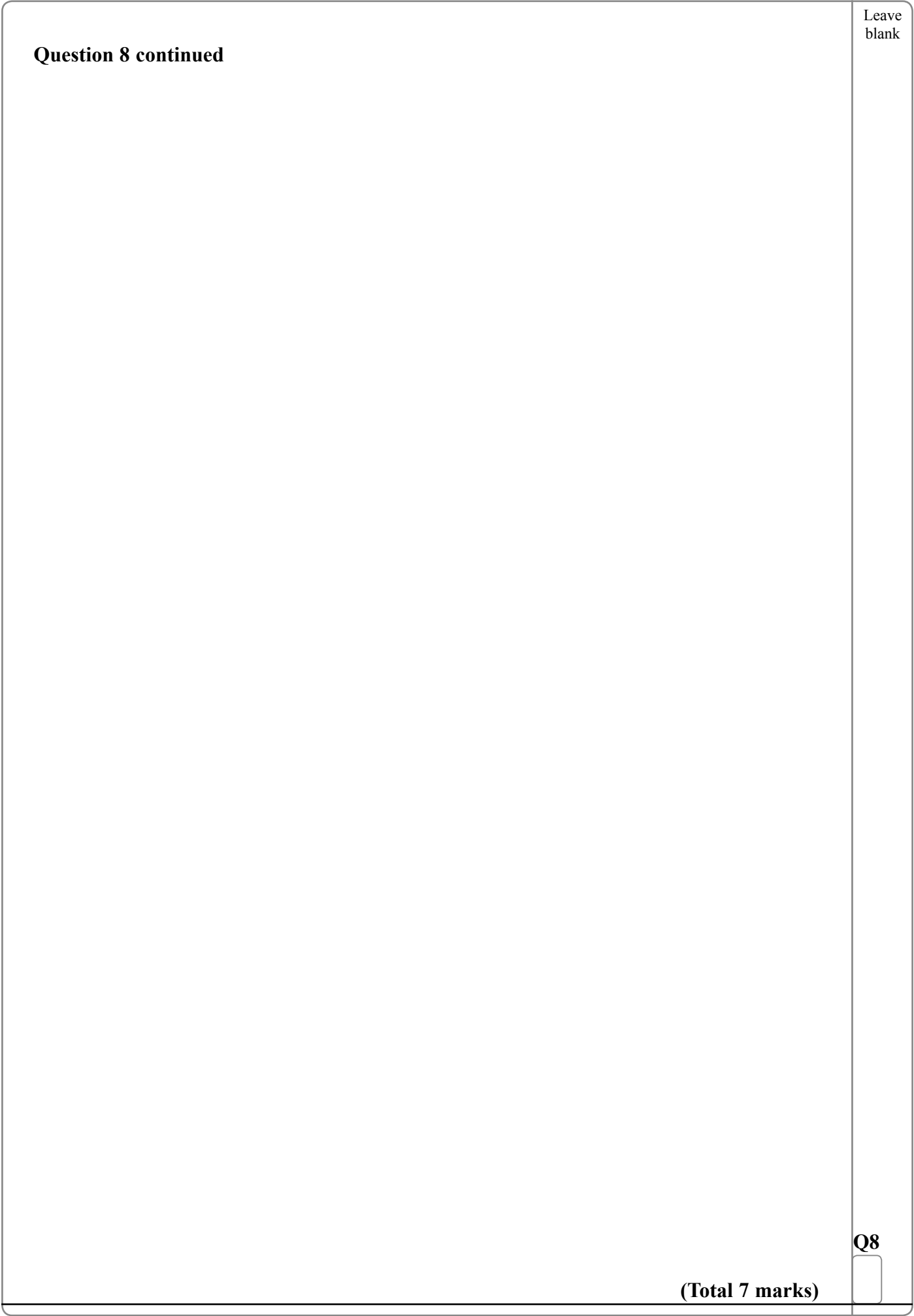


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Question 9 continued

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**Q9**

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Question 10 continued

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**Q10**

**TOTAL FOR PAPER: 75 MARKS**

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