



eClassroom

**Question 1**

Sketch **Figure 2**, which shows part of the curve  $y = f(x)$ , where:

$$f(x) = (x - 2)^2(x + 4).$$

(a) Show that:

$$f'(x) = 3x^2 + 4x - 8.$$

(3 marks)

Points  $A$  and  $B$  are distinct points that lie on the curve  $y = f(x)$ . The gradient of the curve at  $A$  is equal to the gradient of the curve at  $B$ .

Given that point  $A$  has  $x$ -coordinate 2:

(b) Find the  $x$ -coordinate of point  $B$ .

(5 marks)

**Total for question = 8 marks**



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**Question 2**

The curve  $C$  has equation:

$$y = 2x^3 + kx^2 + 6x + 8,$$

where  $k$  is a constant.

**(a)** Find  $\frac{dy}{dx}$ .

(2 marks)

The point  $P$ , where  $x = -2$ , lies on  $C$ . The tangent to  $C$  at  $P$  is parallel to the line with equation  $2y - 10x - 1 = 0$ .

**(b)** Find the value of  $k$ .

(4 marks)

**(c)** Find the  $y$ -coordinate of  $P$ .

(2 marks)

**(d)** Find the equation of the tangent to  $C$  at  $P$ , giving your answer in the form  $ax + by + c = 0$ , where  $a$ ,  $b$ , and  $c$  are integers.

(2 marks)

**Total for question = 10 marks**

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**Total for question = 7 marks**

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### Question 5

Given that:

$$y = \frac{3x^2 + 5}{x^2}.$$

(a) Find  $\frac{dy}{dx}$ , giving each term in your answer in its simplest form.

(6 marks)

**Total for question = 6 marks**

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### Question 6

Given that:

$$y = \frac{4x^3 + 2x - 7}{x^{1/2}}.$$

(a) Find  $\frac{dy}{dx}$ , giving each term in your answer in its simplest form.

(6 marks)

**Total for question = 6 marks**

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