

Write your name here

Surname

Other names

**Pearson**  
**Edexcel GCE**

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

# Core Mathematics C1

## Advanced Subsidiary



Wednesday 18 May 2016 – Morning  
**Time: 1 hour 30 minutes**

Paper Reference

**6663/01**

**You must have:**

Mathematical Formulae and Statistical Tables (Pink)

Total Marks

--

**Calculators may NOT be used in this examination.**

### Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B). Coloured pencils and highlighter pens must not be used.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.

### Information

- The total mark for this paper is 75.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

P46715A

©2016 Pearson Education Ltd.

1/1/1/



**PEARSON**

1. Find

$$\int \left( 2x^4 - \frac{4}{\sqrt{x}} + 3 \right) dx$$

giving each term in its simplest form.

(4)

Area with horizontal lines for writing the solution.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Q1

(Total 4 marks)



2. Express  $9^{3x+1}$  in the form  $3^y$ , giving  $y$  in the form  $ax + b$ , where  $a$  and  $b$  are constants. (2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Lined area for writing the solution to the problem.

(Total 2 marks)

Q2



3. (a) Simplify

$$\sqrt{50} - \sqrt{18}$$

giving your answer in the form  $a\sqrt{2}$ , where  $a$  is an integer.

(2)

(b) Hence, or otherwise, simplify

$$\frac{12\sqrt{3}}{\sqrt{50} - \sqrt{18}}$$

giving your answer in the form  $b\sqrt{c}$ , where  $b$  and  $c$  are integers and  $b \neq 1$ 

(3)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



4.

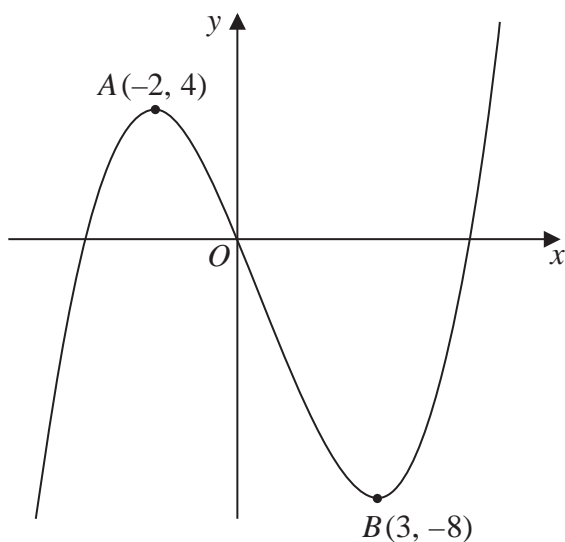


Figure 1

Figure 1 shows a sketch of part of the curve with equation  $y = f(x)$ . The curve has a maximum point  $A$  at  $(-2, 4)$  and a minimum point  $B$  at  $(3, -8)$  and passes through the origin  $O$ .

On separate diagrams, sketch the curve with equation

(a)  $y = 3f(x)$ , (2)

(b)  $y = f(x) - 4$  (3)

On each diagram, show clearly the coordinates of the maximum and the minimum points and the coordinates of the point where the curve crosses the  $y$ -axis.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



5. Solve the simultaneous equations

$$y + 4x + 1 = 0$$

$$y^2 + 5x^2 + 2x = 0$$

(6)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



6. A sequence  $a_1, a_2, a_3, \dots$  is defined by

$$a_1 = 4,$$

$$a_{n+1} = 5 - ka_n, \quad n \geq 1$$

where  $k$  is a constant.

(a) Write down expressions for  $a_2$  and  $a_3$  in terms of  $k$ .

(2)

Find

(b)  $\sum_{r=1}^3 (1 + a_r)$  in terms of  $k$ , giving your answer in its simplest form,

(3)

(c)  $\sum_{r=1}^{100} (a_{r+1} + ka_r)$

(1)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



7. Given that

$$y = 3x^2 + 6x^{\frac{1}{3}} + \frac{2x^3 - 7}{3\sqrt{x}}, \quad x > 0$$

find  $\frac{dy}{dx}$ . Give each term in your answer in its simplified form.

(6)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA







9. On John's 10th birthday he received the first of an annual birthday gift of money from his uncle. This first gift was £60 and on each subsequent birthday the gift was £15 more than the year before. The amounts of these gifts form an arithmetic sequence.

- (a) Show that, immediately after his 12th birthday, the total of these gifts was £225 (1)
- (b) Find the amount that John received from his uncle as a birthday gift on his 18th birthday. (2)
- (c) Find the total of these birthday gifts that John had received from his uncle up to and including his 21st birthday. (3)

When John had received  $n$  of these birthday gifts, the total money that he had received from these gifts was £3375

- (d) Show that  $n^2 + 7n = 25 \times 18$  (3)
- (e) Find the value of  $n$ , when he had received £3375 in total, and so determine John's age at this time. (2)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 9 continued

Lined writing area for question 9.

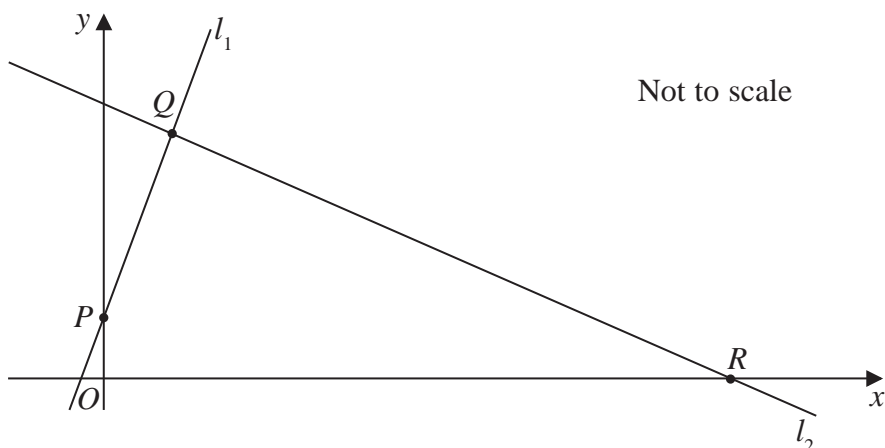
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



10.



**Figure 2**

The points  $P(0, 2)$  and  $Q(3, 7)$  lie on the line  $l_1$ , as shown in Figure 2.

The line  $l_2$  is perpendicular to  $l_1$ , passes through  $Q$  and crosses the  $x$ -axis at the point  $R$ , as shown in Figure 2.

Find

- (a) an equation for  $l_2$ , giving your answer in the form  $ax + by + c = 0$ , where  $a$ ,  $b$  and  $c$  are integers, (5)
- (b) the exact coordinates of  $R$ , (2)
- (c) the exact area of the quadrilateral  $ORQP$ , where  $O$  is the origin. (5)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



**Question 10 continued**

Lined writing area for the answer.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA





