Silver Level S2

Question paper

Level	A Level
Exam Board	Edexcel GCE
Subject	Mathematics
Module	Core 1
Difficulty Level	Silver Level S2
Booklet	Question paper

Time Allowed: **90 minutes**

Score: **/75**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E
>71	62	53	44	36	<28

1. Simplify

(*a*) $(3\sqrt{7})^2$

(1)

(*b*) $(8 + \sqrt{5})(2 - \sqrt{5})$

(3)

June 2009

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2. Find

$$\int \left(10x^4 - 4x - \frac{3}{\sqrt{x}}\right) \mathrm{d}x,$$

giving each term in its simplest form.

(4)

May 2013

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3. Find the set of values of x for which

(*a*) $4x - 5 > 15 - x$,

(2)

(*b*) $x(x - 4) > 12$.

(4)

January 2012

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4. A sequence $u_1,\ u_2,\ u_3,\ \ldots$, satisfies

$$u_{n+1} = 2u_n - 1, \quad n \geq 1.$$

Given that $u_2 = 9$,

(*a*) find the value of u_3 and the value of u_4,

(2)

(*b*) evaluate $\sum_{r=1}^{4} u_r$.

(3)

January 2013

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5. A sequence $a_1, a_2, a_3, \ldots$, is defined by

$$a_1 = k,$$

$$a_{n+1} = 5a_n + 3, \quad n \geq 1,$$

where k is a positive integer.

(a) Write down an expression for a_2 in terms of k.

(1)

(b) Show that $a_3 = 25k + 18$.

(2)

(c) (i) Find $\sum_{r=1}^{4} a_r$ in terms of k, in its simplest form.

(ii) Show that $\sum_{r=1}^{4} a_r$ is divisible by 6.

(4)

May 2011

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6. The curve C has equation $y = \frac{3}{x}$ and the line l has equation $y = 2x + 5$.

(a) Sketch the graphs of C and l, indicating clearly the coordinates of any intersections with the axes.

(3)

(b) Find the coordinates of the points of intersection of C and l.

(6)

June 2008

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7. A curve with equation $y = f(x)$ passes through the point (2, 10). Given that

$$f'(x) = 3x^2 - 3x + 5,$$

find the value of f(1).

(5)

January 2012

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8. (*a*) Find an equation of the line joining $A(7, 4)$ and $B(2, 0)$, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(3)

(*b*) Find the length of AB, leaving your answer in surd form.

(2)

The point C has coordinates $(2, t)$, where $t > 0$, and $AC = AB$.

(*c*) Find the value of t.

(1)

(*d*) Find the area of triangle ABC.

(2)

May 2010

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9. The curve C has equation $y = f(x)$, $x > 0$, and $f'(x) = 4x - 6\sqrt{x} + \frac{8}{x^2}$.

Given that the point $P(4, 1)$ lies on C,

(*a*) find $f(x)$ and simplify your answer.

(6)

(*b*) Find an equation of the normal to C at the point $P(4, 1)$.

(4)

January 2008

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10. (*a*) Sketch the graphs of

(i) $y = x(x + 2)(3 - x)$,

(ii) $y = -\frac{2}{x}$.

showing clearly the coordinates of all the points where the curves cross the coordinate axes.

(6)

(*b*) Using your sketch state, giving a reason, the number of real solutions to the equation

$$x(x + 2)(3 - x) + \frac{2}{x} = 0.$$

(2)

January 2011

11.

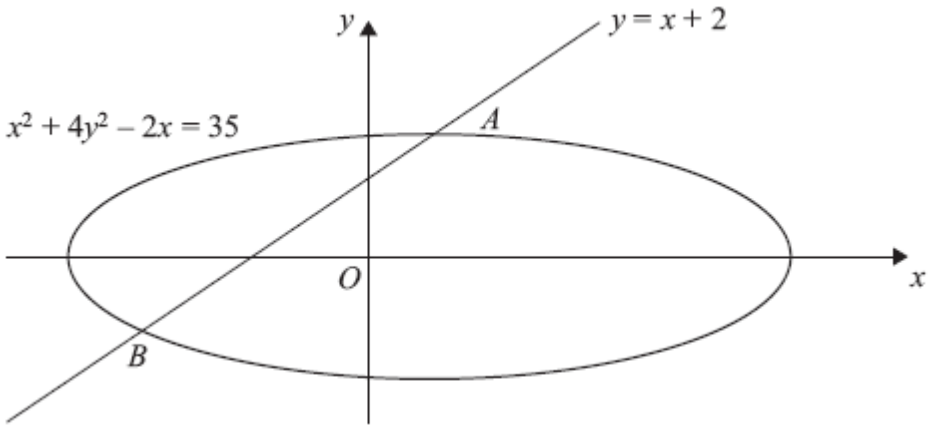

Figure 1

The line $y = x + 2$ meets the curve $x^2 + 4y^2 - 2x = 35$ at the points A and B as shown in Figure 1.

(a) Find the coordinates of A and the coordinates of B.

(6)

(b) Find the distance AB in the form $r\sqrt{2}$, where r is a rational number.

(3)

May 2013 (R)

TOTAL FOR PAPER: 75 MARKS

END