Core mathematics C1(GCE)
Practice Paper 1
(Standard A*)
Time: 1 hour 30 minutes

Materials required for examination
Mathematical Formulae

Items included with question papers
Nil

Instructions to Candidates
If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates
Full marks may be obtained for answers to ALL questions.
This paper has ten questions.

Advice to Candidates
You must ensure that your answers to parts of questions are clearly labelled.
You must show sufficient working to make your methods clear to the examiner.
Answers without working may gain no credit.

Swa-Nash

1. Find $\int (30x^2 + 14x - k)dx$. Where k is a constant.

(4)

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2. Find the set of value(s) of x for which

(a) $-x < 4$,

(1)

(b) $x^2 + 4x + 4 \geq 0$.

(2)

3.

(a) Solve $x^2 + 10x - 24 = 0$

(2)

(b) ***Hence***, solve

$$\frac{4}{x^2} + \frac{20}{x} - 24 = 0$$

(4)

4.

(a) Given that $\sqrt{20} = \sqrt{b} + \sqrt{b}$, find the exact value of b.

(3)

(b) $\sqrt{6+\sqrt{11}} - \sqrt{6-\sqrt{11}}$, Show that this can be written in the form of $\sqrt{k}$. Where k is an integer to be found.

(6)

5.

$x_{n+1} = \frac{1}{2}x_n + 9$. Given that $x_1 = 2$

(a) Find x_2, x_3 and x_4.

(3)

(b) Find x_∞.

(2)

6.

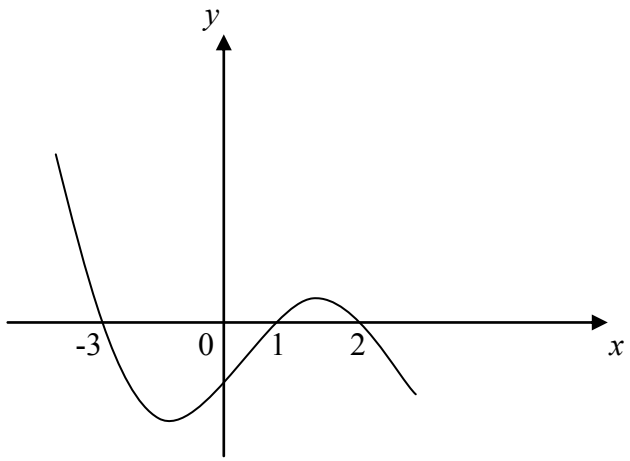
(*a*) Given that $g(x) = x^2 - 2x - 8$ and $g(x+k) = x^2 - 4x - 5$. Find the value *k.*

(4)

(*b*) Sketch $h(x) = x^2(3-x) + 2$

(3)

(*c*)



The above diagram shows the graph $y = f(x+2)$. Sketch $y = f(x-1)$ clearly showing the coordinates of the points where the graph cross the axes.

(4)

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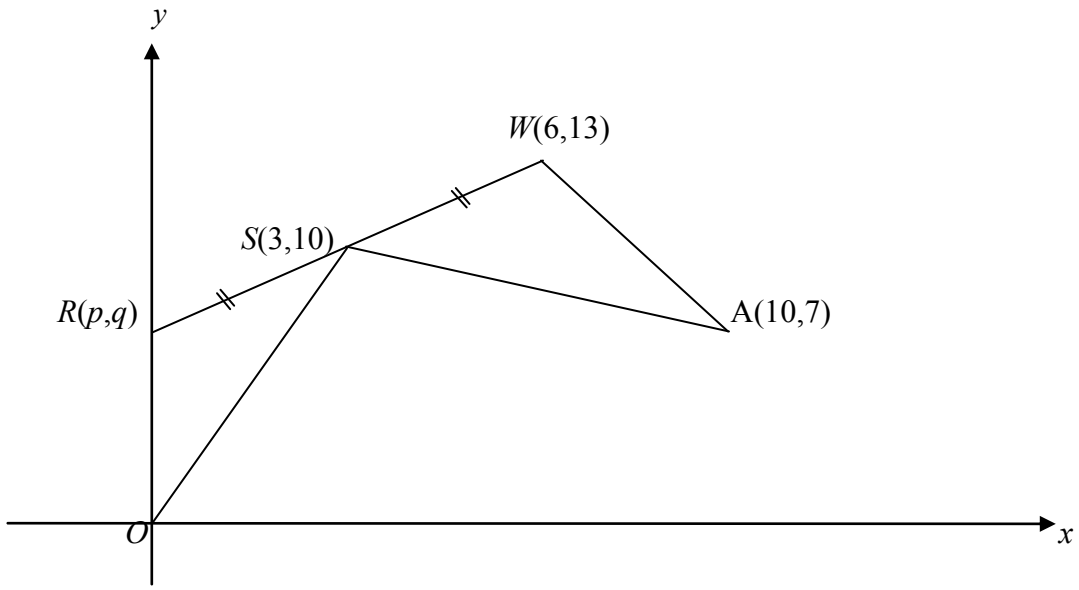
7. **Figure 1**



The points $R(p, q)$, $S(3, 10)$ and $W(6, 13)$ lies on a straight line and *RS* = *SW,* as shown in Fig. 1.

(*a*) Find the values of *p* and *q*.

(2)

(*b*) Show that $\angle SWA \neq 90°$.

(4)

(*c*) Find the area of ΔSWA.

(3)

8.

(*a*) ***Using*** $S_n = \frac{n}{2}[2a + (n-1)d]$ or $S_n = \frac{n}{2}(a + l)$ Find the sum of all the integers between 0 and 50 inclusive.

(2)

(*b*) Hence or otherwise find the sum of all the integers between 0 and 50 that are ***not divisible*** by 4 or 5 or both.

(6)

9.

(*a*) Given that $y = \frac{x^4 - 1}{x + 1} + 1$, find $\frac{dy}{dx}$

(5)

(*b*) The curve with equation $y = ax^2 + bx + c$ passes through the point (1, 2). The gradient of the curve is zero at the point (2, 1). Find the values of *a*, *b* and *c*.

(6)

(*c*) Write down the equation of the normal at the point (2, 1).

(1)

10.

(*a*) The roots of the equation $ax^2 + bx + c = 0$ are $x = -\frac{3}{2}$ and $x = -\frac{5}{7}$. Find *a*, *b* and *c* (where *b* is a prime number).

(5)

(*b*)

(i) Show that $x^2 + 2x - 63 = 0$ can be written in the form of $x(x + 2) = 63$

(2)

(ii) ***Hence***, write down the positive root of the equation $x^2 + 2x - 63 = 0$

(1)