OCR
Oxford Cambridge and RSA

AS Level Mathematics B (MEI)

H630/01 Pure Mathematics and Mechanics

Question Set 1

1. Write $\frac{8}{3-\sqrt{5}}$ in the form $a + b\sqrt{5}$, where a and b are integers to be found. **(2)**

2. Find the binomial expansion of $(3 - 2x)^3$. **(4)**

3.

(i) Sketch the graphs of $y = 4\cos(x)$ and $y = 2\sin(x)$ for $0° \leq x \leq 180°$ on the same axes.

(2)

(ii) Find the exact coordinates of the point of intersection of these graphs, giving your answer in the form $(\arctan(a), k\sqrt{b})$, where a and b are integers and k is rational. **(4)**

(iii) A student argues that without the condition $0° \leq x \leq 180°$ all the points of intersection of the graphs would occur in the intervals of $360°$ because both $\sin(x)$ and $\cos(x)$ are periodic functions with this period. Comment on the validity of the student's argument. **(1)**

In this question you must show detailed reasoning.

4. You are given that $f(x) = 4x^3 - 3x + 1$.

(i) Use the factor theorem to show that $(x + 1)$ is a factor of f(x). **(2)**

(ii) Solve the equation $f(x) = 0$. **(3)**

In this question you must show detailed reasoning.

5. Fig. 5 shows the graph of a quadratic function. The graph crosses the axes at the points $(-1,0), (0,-4)$ and $(2,0)$.

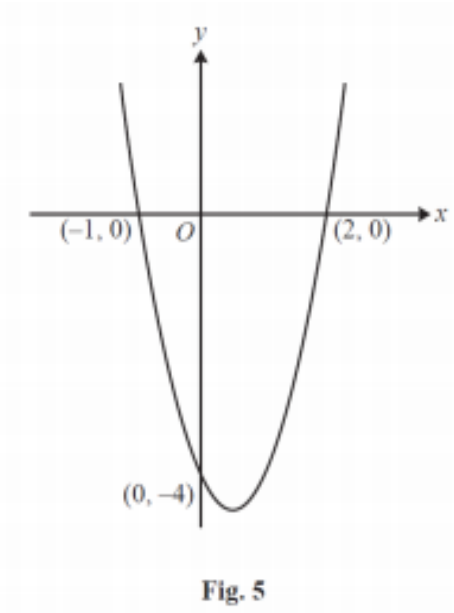

Fig. 5

Find the area of the finite region bounded by the curve and the x-axis. **(8)**