1. Nov/2022/Paper_0606_13/No.4

The polynomial $\mathrm{p}(x)$ is such that $\mathrm{p}(x) = ax^3 + 13x^2 + bx + c$, where a, b and c are integers. It is given that $\mathrm{p}'(0) = -9$.

(a) Show that $b = -9$. [1]

It is also given that $3x+2$ is a factor of $\mathrm{p}(x)$ and that when $\mathrm{p}(x)$ is divided by $x+1$ the remainder is 6.

(b) Find the values of a and c. [4]

(c) Find the quadratic $\mathrm{q}(x)$ such that $\mathrm{p}(x) = (3x+2) \times \mathrm{q}(x)$. [1]

(d) Hence find $\mathrm{p}(x)$ as a product of linear factors with integer coefficients. [1]

2. Nov/2022/Paper_0606_21/No.2

DO NOT USE A CALCULATOR IN THIS QUESTION.

Find the x-coordinates of the points where the line $y = 3x - 8$ cuts the curve $y = 2x^3 + 3x^2 - 26x + 22$. [5]

3. Nov/2022/Paper_0606_22/No.5

DO NOT USE A CALCULATOR IN THIS QUESTION.

Find the x-coordinates of the points of intersection of the curves $y = 7x^3 - 7x^2 - 17x - 4$ and $y = x^3 - 2x^2 - 4x - 16$. [5]

4. Nov/2022/Paper_0606_23/No.4

The line $y = kx + 6$ intersects the curve $y = x^3 - 4x^2 + 3kx + 2$ at the point where $x = 2$.

(a) Find the value of k. [2]

(b) Show that, for this value of k, the line cuts the curve only once. [4]