1. March/2022/Paper_9709/22/No.1

Solve the equation $|5x - 2| = |4x + 9|$. [3]

2. March/2022/Paper_9709/22/No.6

The polynomial $p(x)$ is defined by

$$p(x) = 4x^3 + 16x^2 + 9x - 15.$$

(a) Find the quotient when $p(x)$ is divided by $(2x + 3)$, and show that the remainder is -6. [3]

(b) Find $\int \frac{p(x)}{2x+3}\,dx$. [2]

(c) Factorise $p(x) + 6$ completely and hence solve the equation

$$p(\text{cosec } 2\theta) + 6 = 0$$

for $0° < \theta < 135°$. [5]

3. June/2022/Paper_9709/21/No.7

The polynomial $p(x)$ is defined by

$$p(x) = 2x^3 + 5x^2 + ax + 2a,$$

where a is an integer.

(a) Find, in terms of x and a, the quotient when $p(x)$ is divided by $(x + 2)$, and show that the remainder is 4. [3]

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(b) It is given that $\int_{-1}^{1} \frac{p(x)}{x+2}\,dx = \frac{22}{3} + \ln b$, where b is an integer.

Find the values of a and b. [6]

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4. June/2022/Paper_9709/22/No.2

(a) Sketch, on the same diagram, the graphs of $y = |2x - 9|$ and $y = 5x - 3$. [2]

(b) Solve the equation $|2x - 9| = 5x - 3$. [2]

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5. June/2022/Paper_9709/22/No.5

The polynomial $p(x)$ is defined by

$$p(x) = 2x^3 + ax^2 - 3x - 4,$$

where a is a constant. It is given that $(x - 4)$ is a factor of $p(x)$.

(a) Find the value of a and hence factorise $p(x)$. [4]

(b) Show that the equation $p(e^{3y}) = 0$ has only one real root and find its exact value. [3]