1. Nov/2021/Paper_12/No.6

DO NOT USE A CALCULATOR IN THIS QUESTION.

The polynomial $p(x) = 10x^3 + ax^2 - 10x + b$, where a and b are integers, is divisible by $2x+1$. When $p(x)$ is divided by $x+1$, the remainder is -24.

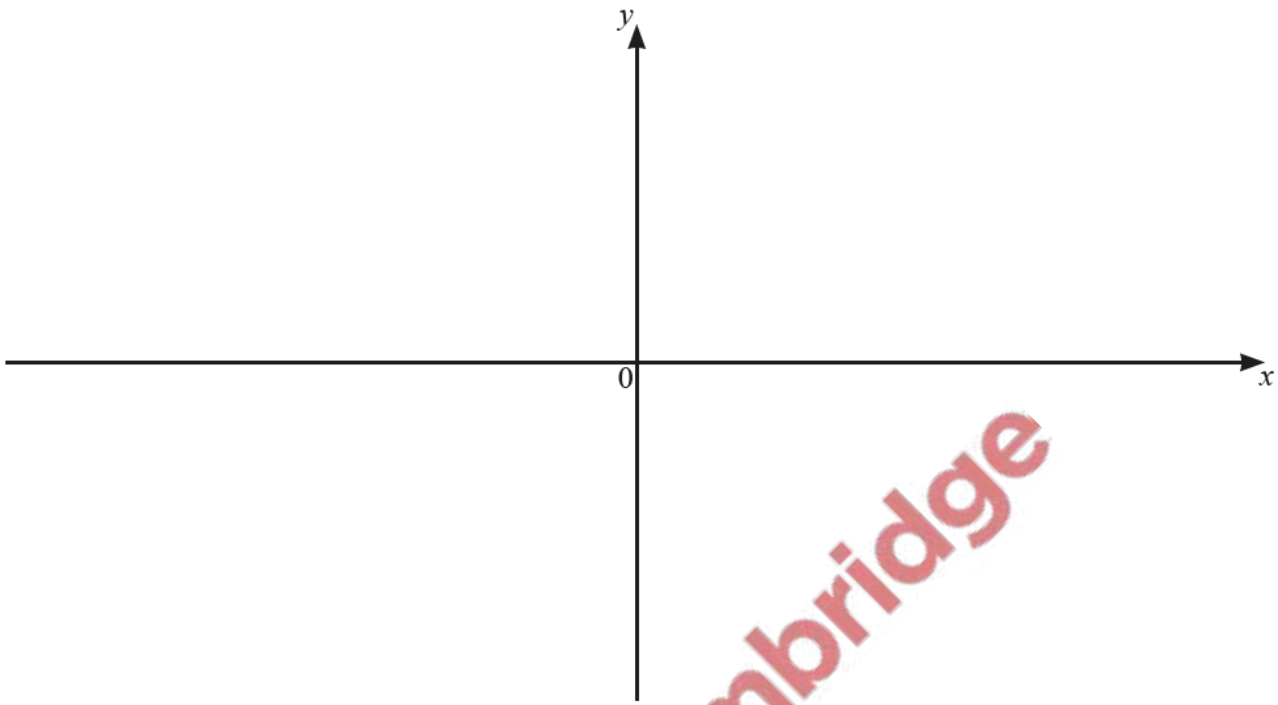
(a) Find the value of a and of b. [4]

(b) Find an expression for $p(x)$ as the product of three linear factors. [4]

(c) Write down the remainder when $p(x)$ is divided by x. [1]

2. Nov/2021/Paper_13/No.1

On the axes below, sketch the graph of $y = -\frac{1}{4}(2x+1)(x-3)(x+4)$ stating the intercepts with the coordinate axes. [3]



3. June/2021/Paper_11/No.3

The polynomial $p(x) = ax^3 - 9x^2 + bx - 6$, where a and b are constants, has a factor of $x - 2$. The polynomial has a remainder of 66 when divided by $x - 3$.

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

(b) Using your values of a and b, show that $p(x) = (x - 2)q(x)$, where $q(x)$ is a quadratic factor to be found. [2]

(c) Hence show that the equation $p(x) = 0$ has only one real solution. [2]

4. June/2021/Paper_14/No.8

The polynomial $\mathrm{p}(x)$ is ax^3+bx^2+7x+1, where a and b are integers. It is given that $2x+1$ is a factor of $\mathrm{p}(x)$ and that when $\mathrm{p}(x)$ is divided by $x-3$ there is a remainder of 175.

(a) Find the value of a and of b. [5]

(b) Using your values of a and b from **part (a)**, find the remainder when $\mathrm{p}'(x)$ is divided by $x-1$. [3]

5. June/2021/Paper_22/No.4

The polynomial $\mathrm{p}(x) = mx^3 - 29x^2 + 39x + n$, where m and n are constants, has a factor $3x - 1$, and remainder 6 when divided by $x - 1$. Show that $x - 2$ is a factor of $\mathrm{p}(x)$. [6]