

1 (a)
$$p(x) = 15x^3 + 22x^2 - 15x + 2$$

Find the remainder when p(x) is divided by x + 1.

(2 marks)

(b) (i) Show that
$$x + 2$$
 is a factor of $p(x)$.

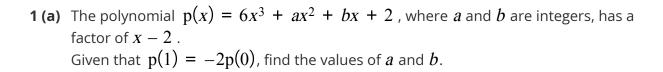
[1]

(ii) Write
$$p(x)$$
 as a product of linear factors.

[3]

(4 marks)

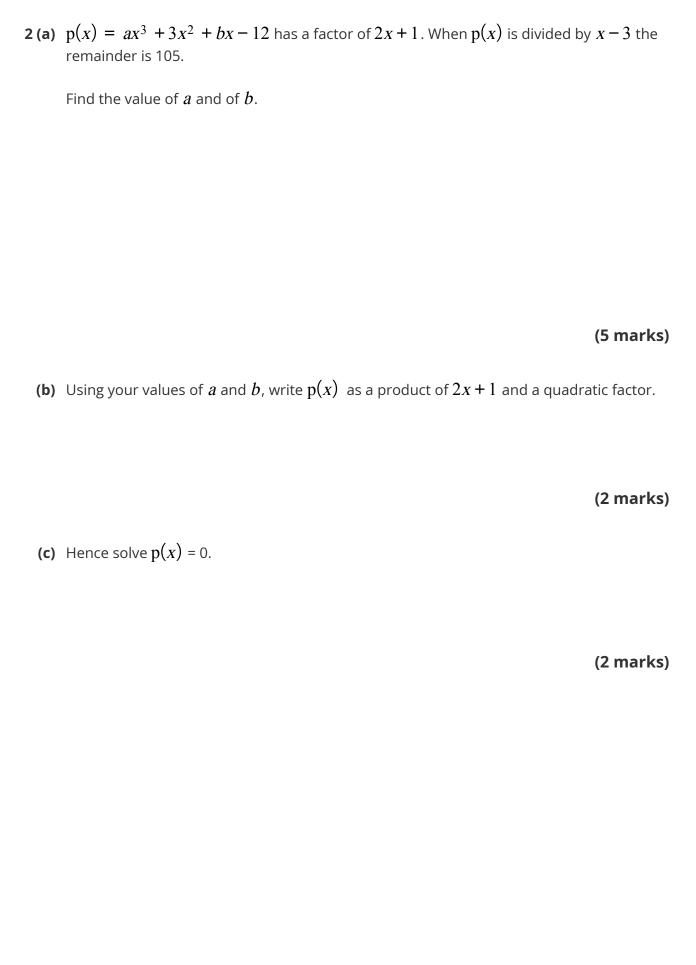




(4 marks)

- **(b)** Using your values of a and b,
 - (i) find the remainder when p(x) is divided by 2x 1
 - (ii) factorise p(x).

(4 marks)



3 (a)
$$p(x) = 6x^3 + ax^2 + 12x + b$$
, where a and b are integers.

p(x) has a remainder of 11 when divided by x-3 and a remainder of -21 when divided by x+1.

Given that p(x) = (x-2)Q(x), find Q(x), a quadratic factor with numerical coefficients.

(6 marks)

(b) Hence solve p(x) = 0.

(2 marks)

4 The three roots of p(x) = 0, where $p(x) = 2x^3 + ax^2 + bx + c$ are $x = \frac{1}{2}$, x = n and x = -n, where a, b, c and n are integers. The y-intercept of the graph of y = p(x) is 4. Find p(x), simplifying your coefficients.

(5 marks)

Very Hard Questions		
1 (a)	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 $x-3$. Find the value of a and of b .	
		(4 marks)
(b)	Using your values of a and b , show that $p(x) = (x-2)q(x)$, where $q(x)$ is a factor to be found.	quadratic
		(2 marks)
(c)	Hence show that the equation $p(x) = 0$ has only one real solution.	
		(2 marks)

2 (a)
$$p(x) = 2x^3 - 3x^2 - 23x + 12$$

Find the value of $p\left(\frac{1}{2}\right)$.

(1 mark)

(b) Write p(x) as the product of three linear factors and hence solve p(x) = 0.

(5 marks)

