

# Factor & Remainder Theorem

## Difficulty: Easy

### Question Paper 1

Level	A Level
Subject	Maths Pure 3
Exam Board	CIE
Topic	Algebra
Sub-Topic	Factor & Remainder Theorem
Difficulty	Easy
Booklet	Question Paper 1

**Time allowed:** 34 minutes

**Score:** /24

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E
>90%	81%	70%	58%	46%	34%

## Question 1

The polynomial  $8x^3 + ax^2 + bx - 1$ , where  $a$  and  $b$  are constants, is denoted by  $p(x)$ . It is given that  $(x + 1)$  is a factor of  $p(x)$  and that when  $p(x)$  is divided by  $(2x + 1)$  the remainder is 1.

(i) Find the values of  $a$  and  $b$ . [5]

(ii) When  $a$  and  $b$  have these values, factorise  $p(x)$  completely. [3]

## Question 2

The polynomial  $ax^3 + bx^2 + 5x - 2$ , where  $a$  and  $b$  are constants, is denoted by  $p(x)$ . It is given that  $(2x - 1)$  is a factor of  $p(x)$  and that when  $p(x)$  is divided by  $(x - 2)$  the remainder is 12.

(i) Find the values of  $a$  and  $b$ . [5]

(ii) When  $a$  and  $b$  have these values, find the quadratic factor of  $p(x)$ . [2]

### Question 3

Find the quotient and remainder when  $2x^2$  is divided by  $x + 2$ .

[3]

### Question 4

The polynomial  $ax^3 - 20x^2 + x + 3$ , where  $a$  is a constant, is denoted by  $p(x)$ . It is given that  $(3x + 1)$  is a factor of  $p(x)$ .

(i) Find the value of  $a$ .

[3]

(ii) When  $a$  has this value, factorise  $p(x)$  completely.

[3]