

## CHAPTER 4: REMAINDER AND FACTOR THEOREM

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Solve for what is asked in each item. Marks may be deducted for not showing complete work.

- Given that  $5x^2 + 15x - 29 \equiv A(x - 1)(x + 3) + B(x - 3) + C$  for all values of  $x$ .  
Find the values of  $A$ ,  $B$  and  $C$ . [4]
- If  $f(x) = 2x^3 + 3x^2 - 29x - 60$ ,
  - find the remainder when  $f(x)$  is divided by  $(x + 2)$ , [2]
  - use the factor theorem to show that  $(x + 3)$  is a factor of  $f(x)$ , [2]
  - factorise  $f(x)$  completely. [3]
- The expression  $x^3 + 2ax^2 - bx - 5a$  is exactly divisible by  $x^2 + 6x + 5$ . Calculate the values of  $a$  and  $b$ . [5]
- One of the factors of  $x^2 - 5x + 6$  is a factor of  $f(x) = x^3 + hx^2 - 4x + 3$  where  $h$  is an integer. Find the value of  $h$  and the common factor, hence find the remainder when  $f(x)$  is divided by  $(3x + 2)$ . [4]
- Factorise  $x^4 + x^3 - 6x^2 - 4x + 8$  completely. [5]
- The expression  $f(x) = mx^3 - (m + 3n)x^2 + 2nx + p$  is exactly divisible by  $x^2 - 2x$ . When  $f(x)$  is divided by  $x - 1$ , the remainder is 8 more than when it is divided by  $(x + 1)$ .
  - Find the values of  $m$ ,  $n$  and  $p$ . [6]
  - Factorise  $f(x)$  completely. [2]
  - Write the range of values of  $x$  if  $\frac{f(x)}{x} > 0$ . [2]