

FAS-PASS  
**Maths**  
CSEC ADD MATHS 2021

SECTION I

Answer all questions.

ALL working must be clearly shown.

1. (a) (i) Determine the remainder when  $f(x) = ax^3 + 7x^2 - 7x - 3$  is divided by  $x - 1$ .

**SOLUTION:**

**Data:**  $f(x) = ax^3 + 7x^2 - 7x - 3$

**Required to determine:** The remainder when  $f(x)$  is divided by  $x - 1$ .

**Solution:**

If  $f(x)$  is any polynomial and  $f(x)$  is divided by  $(x - a)$ , the remainder is  $f(a)$ .

Hence, the remainder when  $f(x) = ax^3 + 7x^2 - 7x - 3$  is divided by  $x - 1$

$$\begin{aligned} \text{is } f(1) &= a(1)^3 + 7(1)^2 - 7(1) - 3 \\ &= a + 7 - 7 - 3 \\ &= a - 3 \end{aligned}$$

- (ii) If the remainder when  $f(x)$  is divided by  $(x + 3)$  is equal to the remainder determined in (a) (i), find the value of  $a$ .

**SOLUTION:**

**Data:** The remainder when  $f(x)$  is divided by  $(x + 3)$  is equal to the remainder determined in (a) (i) above.

**Required to find:** The value of  $a$ .

**Solution:**

When  $f(x)$  is divided by  $x + 3$ , the remainder is  $f(-3)$ .

$$\begin{aligned} f(-3) &= a(-3)^3 + 7(-3)^2 - 7(-3) - 3 \\ &= -27a + 63 + 21 - 3 \\ &= -27a + 81 \end{aligned}$$

$$f(-3) = f(1) \quad (\text{data})$$

$$\begin{aligned} \therefore -27a + 81 &= a - 3 \\ 81 + 3 &= a + 27a \end{aligned}$$

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