

**QUESTION 2** (6 marks)

Polynomial  $S(x)$  has a remainder of  $x+1$  when divided by  $x^2+x-2$ .

- (a) (i) Write  $S(x)$  in the form  $S(x) = Q(x)D(x) + R(x)$ , where  $Q(x)$  is the quotient,  $D(x)$  is the divisor, and  $R(x)$  is the remainder.

$$S(x) = Q(x)(x^2+x-2) + x+1$$

(2 marks)

- (ii) Find the remainder when  $S(x)$  is divided by  $x+2$ .

$$S(-2) = -1$$

(2 marks)

- (b) If  $P(x) = S(x) - T(x)$ , where  $T(x)$  is a polynomial and  $T(-2) = -1$ , show that  $x = -2$  is a zero of the polynomial  $P(x)$ .

$$\begin{aligned} P(-2) &= S(-2) - T(-2) \\ &= -1 - (-1) \\ &= 0 \end{aligned}$$

ie.  $x = -2$  is a zero of  $P(x)$

(2 marks)