

**13 (a)** Given that

$$P(x) = 125x^3 + 150x^2 + 55x + 6$$

use the factor theorem to prove that  $(5x + 1)$  is a factor of  $P(x)$ .

**[2 marks]**

**13 (b)** Factorise  $P(x)$  completely.

**[3 marks]**

**13 (c)** Hence, prove that  $250n^3 + 300n^2 + 110n + 12$  is a multiple of 12 when  $n$  is a positive whole number.

**[3 marks]**