

11 The polynomial $p(x)$ is given by

$$p(x) = x^3 + (b + 2)x^2 + 2(b + 2)x + 8$$

where b is a constant.

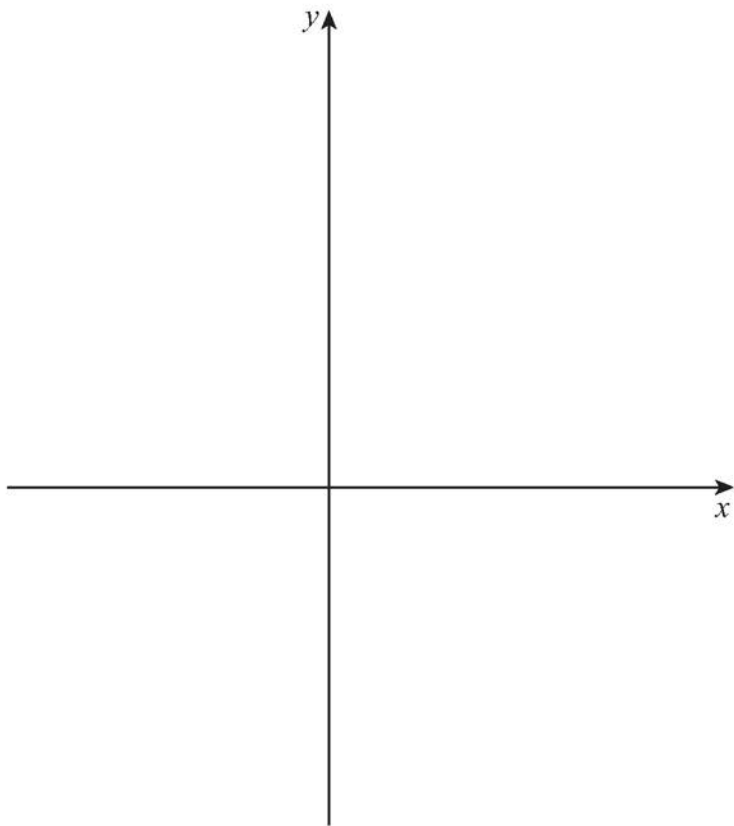
11 (a) Use the factor theorem to prove that $(x + 2)$ is a factor of $p(x)$ for **all** values of b .

[3 marks]

11 (b) The graph of $y = p(x)$ meets the x -axis at exactly two points.

11 (b) (i) Sketch a possible graph of $y = p(x)$

[3 marks]



11 (b) (ii) Given $p(x)$ can be written as

$$p(x) = (x + 2)(x^2 + bx + 4)$$

find the value of b .

Fully justify your answer.

[4 marks]