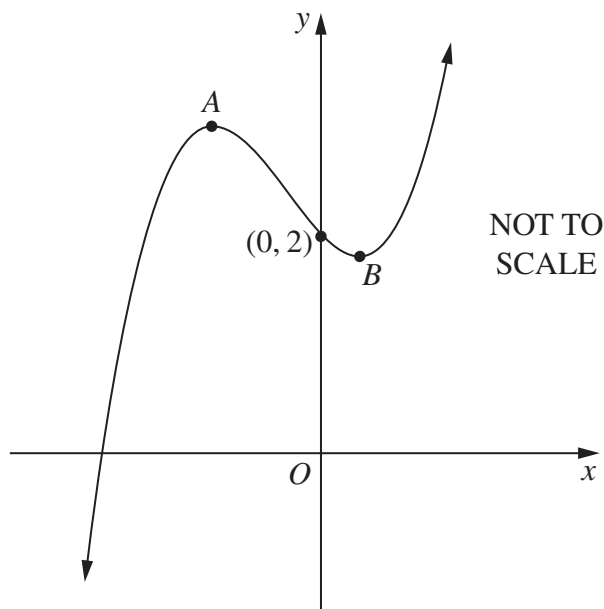


Question 6 (12 marks) Use a SEPARATE writing booklet.

- (a) The first three terms of an arithmetic series are $-1 + 4 + 9 + \dots$
- (i) Find the 60th term. 2
- (ii) Hence, or otherwise, find the sum of the first 60 terms of the series. 2
- (b) Find α so that the equation $P = 100(1.23)^t$ can be rewritten as $P = 100e^{\alpha t}$. 2
Give your answer in decimal form.

- (c) The graph of $y = x^3 + x^2 - x + 2$ is sketched below. The points A and B are the turning points.



- (i) Find the coordinates of A and B . 3
- (ii) For what values of x is the curve concave up? Give reasons for your answer. 2
- (iii) For what values of k has the equation $x^3 + x^2 - x + 2 = k$ three real solutions? 1