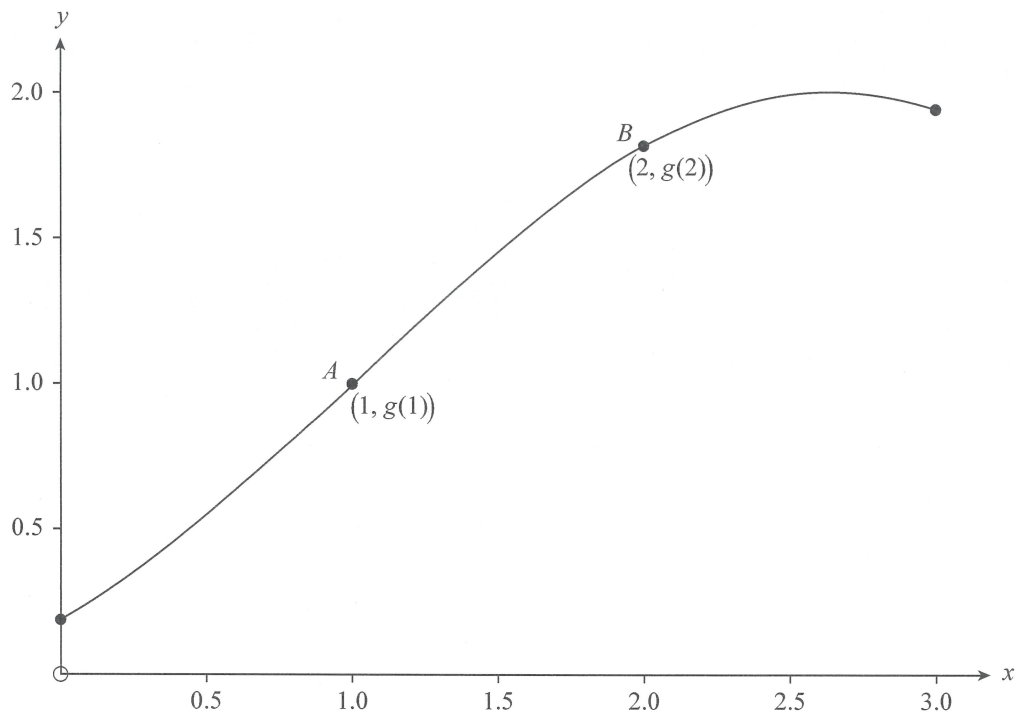


Question 5 (6 marks)

The graph of the curve $y = g(x)$ for $0 \leq x \leq 3$ is shown below.



Points A and B lie on the curve. Point A is the only point of inflection.

(a) Which *one* of the following statements is true? Tick the appropriate box, and justify your answer.

$g'(1) < g'(2)$

$g'(1) = g'(2)$

$g'(1) > g'(2)$

Justification:

Whenever the graph of $y = g(x)$ has a point of inflection, $g'(x)$ has a local maximum or minimum.
The graph of $y = g(x)$ has its only point of inflection at A , therefore $g'(1)$ is the global maximum

(2 marks)

(b) Which *one* of the following statements is true? Tick the appropriate box, and justify your answer.

$g''(1) < 0$

$g''(1) = 0$

$g''(1) > 0$

Justification:

Whenever the graph of $y=g(x)$ has a point of inflection, $g''(x)=0$ AND $g''(x)$ changes sign.
The graph of $y=g(x)$ has a point of inflection at A, therefore $g''(1)=0$

(2 marks)

(c) Which *one* of the following statements is true? Tick the appropriate box, and justify your answer.

$g''(2) < 0$

$g''(2) = 0$

$g''(2) > 0$

Justification:

Whenever the graph of $y=g(x)$ is concave downwards in shape, $g''(x) < 0$.
The graph of $y=g(x)$ is concave downwards in shape at B, therefore $g''(2) < 0$

(2 marks)