1. **In this question you must show all stages of your working.**

Solutions relying entirely on calculator technology are not acceptable.

A particle P moves on the x-axis.
At time t seconds, $0 \leqslant t \leqslant 3$, the displacement of P relative to the origin is x metres where

$$x = 2t^4 - 14t^3 + \frac{45}{2}t^2 + 14t$$

(a) Verify that P is at instantaneous rest when $t = 2$

(3)

Given that this is the only value of t, in the interval $0 \leqslant t \leqslant 3$, for which P is at rest,

(b) find the total distance travelled by P in the interval $0 \leqslant t \leqslant 3$

(2)

(c) Find the magnitude of the acceleration of P when $t = 1.5$

(3)

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Question 1 continued

(Total for Question 1 is 8 marks)