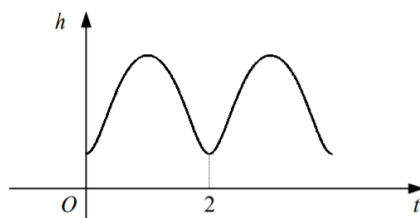


1. The graph shows the height, h cm of letters on a website advert t seconds after the advert appears on the screen. For t in the interval $0 \leq t \leq 2$, h is given by the equation,

$$H = 2t^4 - 8t^3 + 8t^2 + 1$$



For larger values of t , the variation of h over this interval is repeated every 2 seconds.

- Find $\frac{dh}{dt}$ for t in the interval $0 \leq t \leq 2$ (1)
- Find the rate at which the maximum height of the letters is increasing when $t = 0.25$. (1)
- Find the maximum height of the letters. (3)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Solutions

1a.

$\frac{dh}{dt} = 8t^3 - 24t^2 + 16t$	M1
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1b.

When $t = 0.25$, $\frac{dh}{dt} = 2.625$ cm per second.	M1
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1c.

Stationary point: $8t^3 - 24t^2 + 16t = 0$	M1
$8t(t - 1)(t - 2) = 0$ $t = 0$ $t = 1$ $t = 2$	M1
From graph, maximum occurs when $t = 1$, Therefore, maximum height is 3 cm.	M1

