

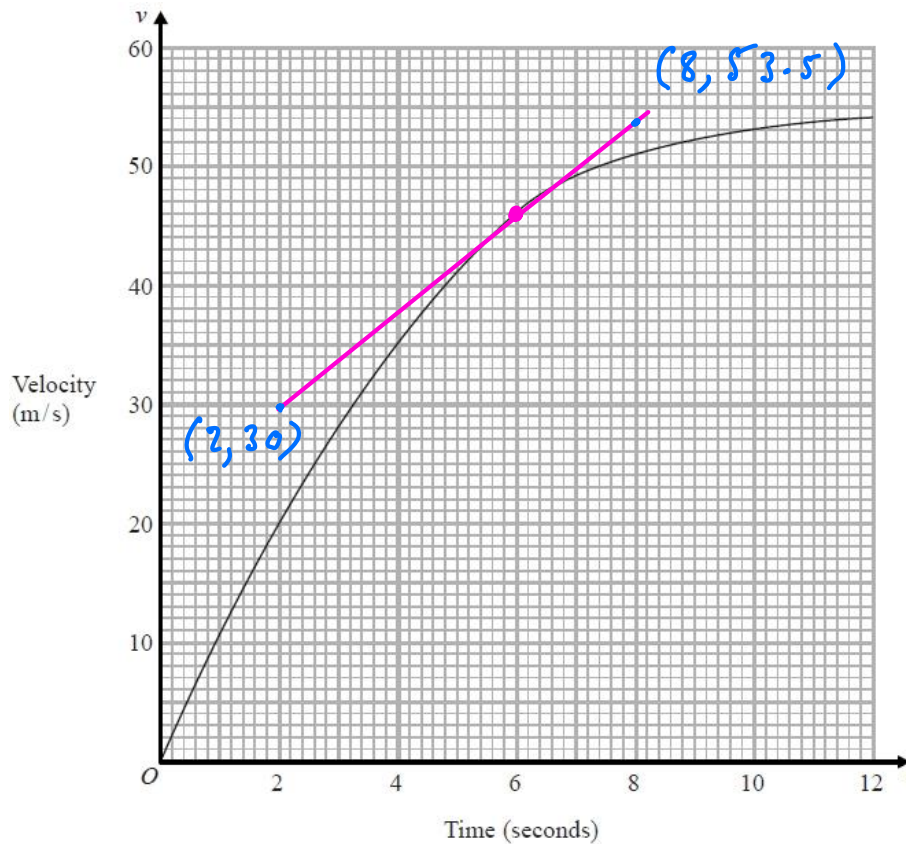
Gradients at points on a curve

Questions

Q1.

Draw a tangent to the curve at the required point and find gradient of tangent

The graph shows information about the velocity, v m/s, of a parachutist t seconds after leaving a plane.



(a) Work out an estimate for the acceleration of the parachutist at $t = 6$

$$\text{acc} = \text{gradient} = \frac{(53.5 - 30)}{(8 - 2)} = 3.9 \text{ m/s}^2$$

..... m/s²
(2)

(b) Work out an estimate for the distance fallen by the parachutist in the first 12 seconds after leaving the plane. Use 3 strips of equal width.

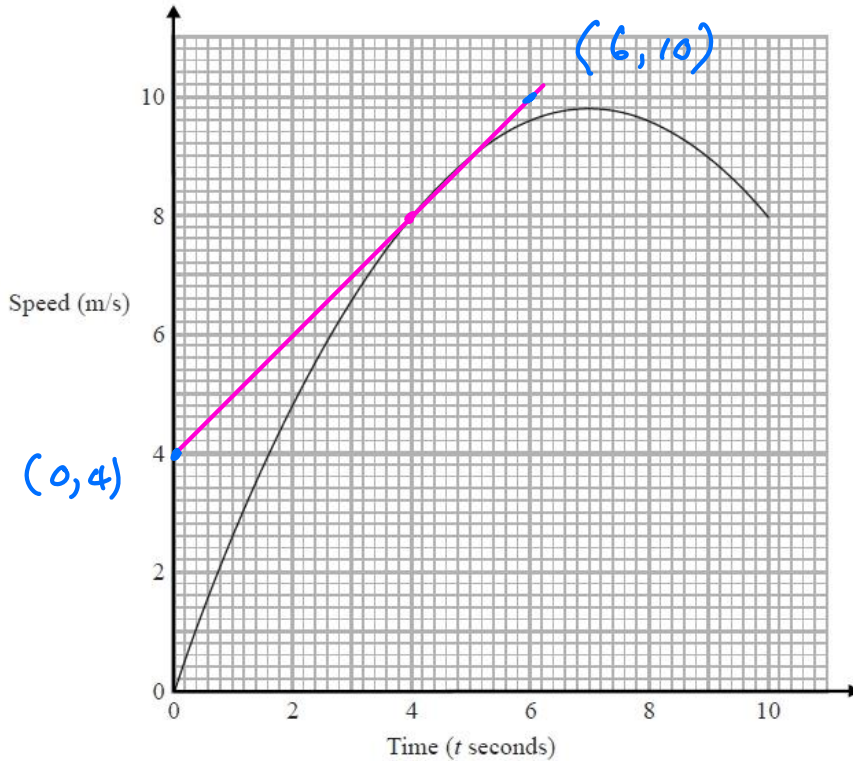
..... m
(3)

(Total for question is 5 marks)

Q2.

Karol runs in a race.

The graph shows her speed, in metres per second, t seconds after the start of the race.



$$\begin{aligned} \text{gradient} &= \frac{10-4}{6-0} \\ &= \frac{6}{6} \\ &= 1 \end{aligned}$$

- (a) Calculate an estimate for the gradient of the graph when $t = 4$
You must show how you get your answer.

$$1 \text{ m/s}^2$$

(3)

- (b) Describe fully what your answer to part (a) represents.

The instantaneous acceleration when
 $t = 4 \text{ s}$

(2)

- (c) Explain why your answer to part (a) is only an estimate.

Difficult to draw tangent accurately

(1)

(Total for question = 6 marks)