

Rates of Change

Starter

1. (Review of last lesson) A curve passes through the following points.

x	0.2	0.4	0.6	0.8	1.0	1.2
y	3.20	3.39	3.56	3.72	3.84	3.93

Use the trapezium rule to estimate the area under the curve from $x = 0.2$ to $x = 1.2$.

Working: There are 6 x -values so this means there will be 5 trapezia.
Width of each trapezia is 0.2.

$$\text{Area} \approx \frac{1}{2} \text{trapezia width} \left(1\text{st height} + 2 \left(\text{middle heights} \right) + \text{last height} \right)$$

$$\begin{aligned} \text{Area} &\approx \frac{1}{2} \times 0.2 \times \left(3.20 + 2(3.39 + 3.56 + 3.72 + 3.84) + 3.93 \right) \\ &= 3.615 \end{aligned}$$

The area under the curve is approximately 3.615 units².

Print this [worksheet](#) and do **Examples 1** and **2**. Compare your answers to those below.

Example 1: Average rate of change = 5 m/s
Instantaneous rate of change = 4 ± 0.5 m/s

Example 2: Average rate of change = -3 m/s²
Instantaneous rate of change = -4.5 ± 0.5 m/s²

Remember: when the line does down, the gradient is negative.

Video: [Average rate of change](#)
Video: [Instantaneous rates of change](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook: p205 E6.10 Qu 1-6
A*-G class textbook: No exercise
9-1 homework book: p74 E6.10 Qu 1-5
A*-G homework book: No exercise