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2019 **12a**
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Distance A is inversely proportional to distance B , such that $A = \frac{9}{B}$, where A and B are measured in metres. The two distances vary with respect to time. Distance B is increasing at a rate of 0.2 ms^{-1} . What is the value of $\frac{dA}{dt}$ when $A = 12$?

$$A = \frac{9}{B}$$

Substitute $A = 12$:

$$12 = \frac{9}{B}$$

$$B = \frac{3}{4} \quad \checkmark$$

State Mean:
2.43/3

$$A = 9B^{-1}$$

$$\frac{dA}{dB} = -9B^{-2}$$

$$\frac{dA}{dB} \left(\frac{3}{4} \right) = -9 \left(\frac{3}{4} \right)^{-2}$$

$$= -16 \quad \checkmark$$

$$\frac{dA}{dt} = \frac{dA}{dB} \times \frac{dB}{dt}$$

$$= -16 \times 0.2$$

$$= -3.2$$

$$\therefore \frac{dA}{dt} = -3.2 \text{ ms}^{-1} \quad \checkmark$$

* These solutions have been provided by [projectmaths](#) and are not supplied or endorsed by NESA.

Marking Feedback:

Looking for **Mathematics Extension 2** Revision?

Students should:

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- recognise a related rates question and understand the processes required to solve it.

In better responses students were able to find the:

- show the use of the chain rule
- show their result for $\frac{dA}{dB}$
- evaluate B correctly and substituted it correctly into the chain rule.

Areas for students to improve include:

- using the calculator correctly
- differentiating to find $\frac{dA}{dB}$