

Sec 2.4

Using rates of change to create a graphical model

We are able to model mathematical problems using graphs

Examples:

-distance/time graphs where slope shows speed

-speed/time graphs where slope shows acceleration

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Recall:

$$\text{speed} = \frac{\begin{array}{c} \text{distance travelled} \\ \text{or} \\ \text{displacement} \end{array}}{\text{change in time}}$$

Note:

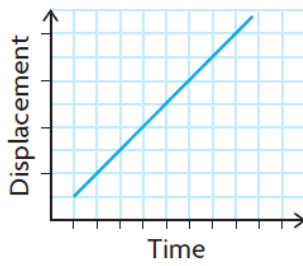
The absolute values signs are needed for speed, without them it is velocity.

$$v = \frac{|\Delta d|}{|\Delta t|}$$

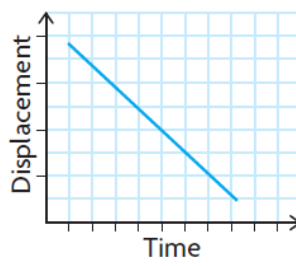
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Need to Know

- When the rate of change of displacement (or speed) is constant:

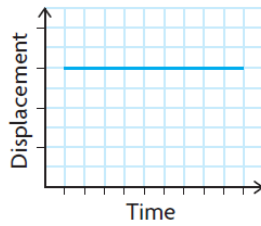


An increasing line indicates that displacement increases as time increases.



A decreasing line indicates that displacement decreases as time increases.

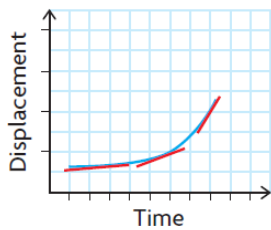
more



A horizontal line indicates that there is no change in displacement as time increases.

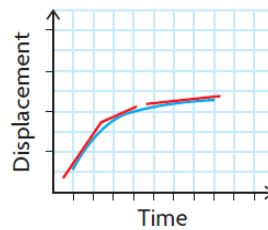
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- When the rate of change of displacement (or speed) is variable, an increasing curve indicates that displacement increases as time increases.



The speed is increasing as the time increases.

or

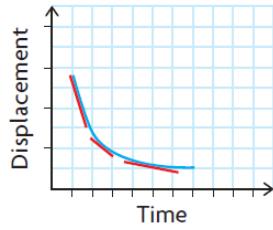


The speed is decreasing as the time increases.

(accelerated motion)

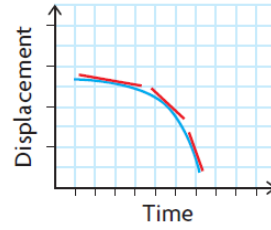
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- A decreasing curve indicates that displacement decreases as time increases.



The speed is decreasing as the time increases.

or

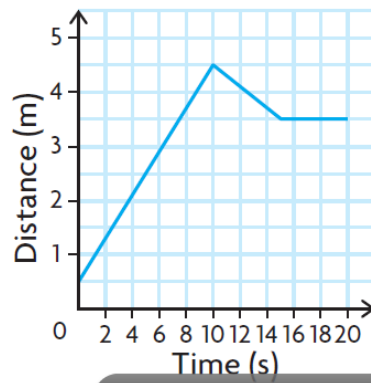
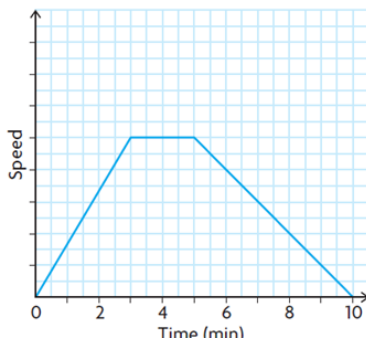


The speed is increasing as the time increases.

(negative accelerated motion)

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Be very careful when interpreting a graph to understand what the axes represent.



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Homework

Read Ex 3 and 4
p103 #1,3,4,5,8

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