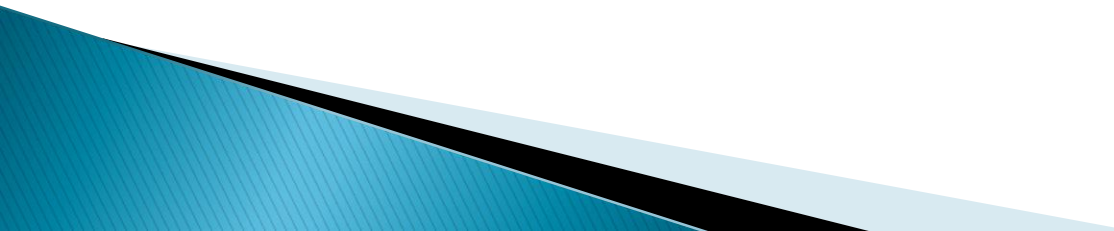


Classical Physics

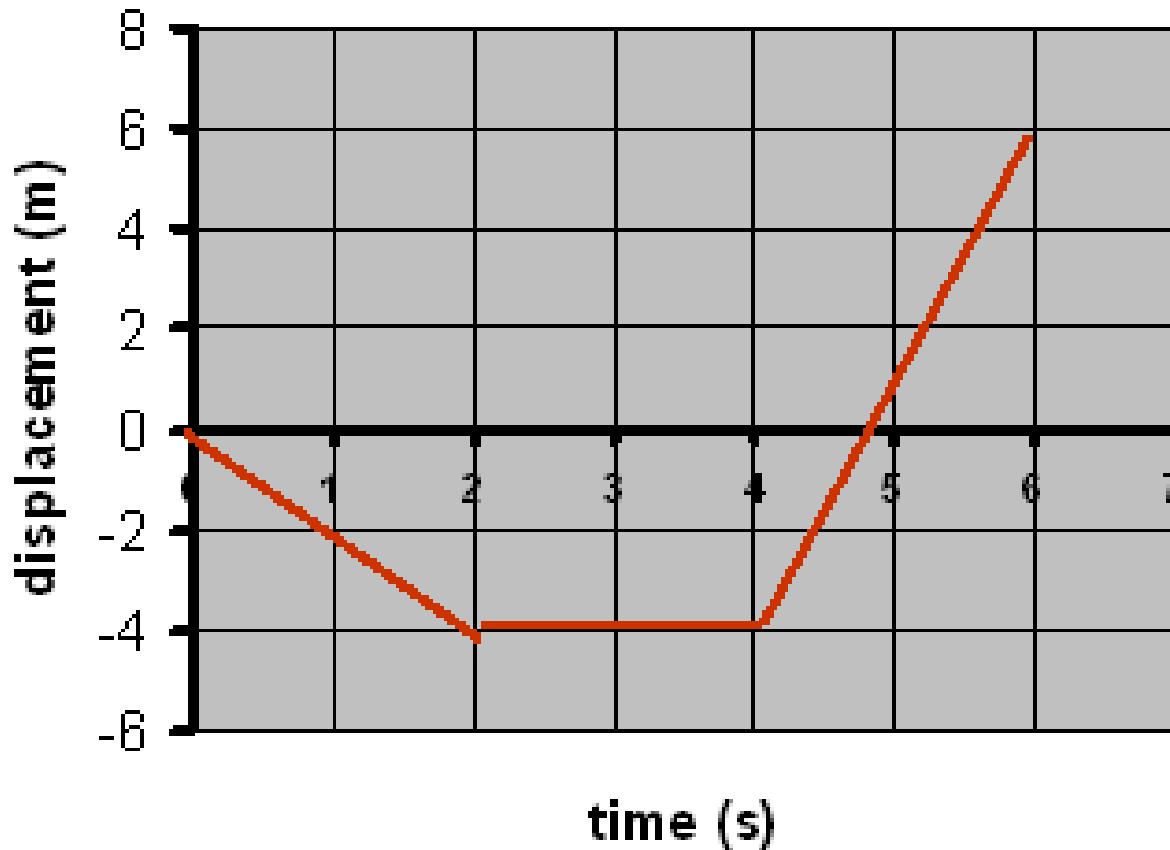
Year 10 Pathway C

Mr. D. Patterson

Outcomes

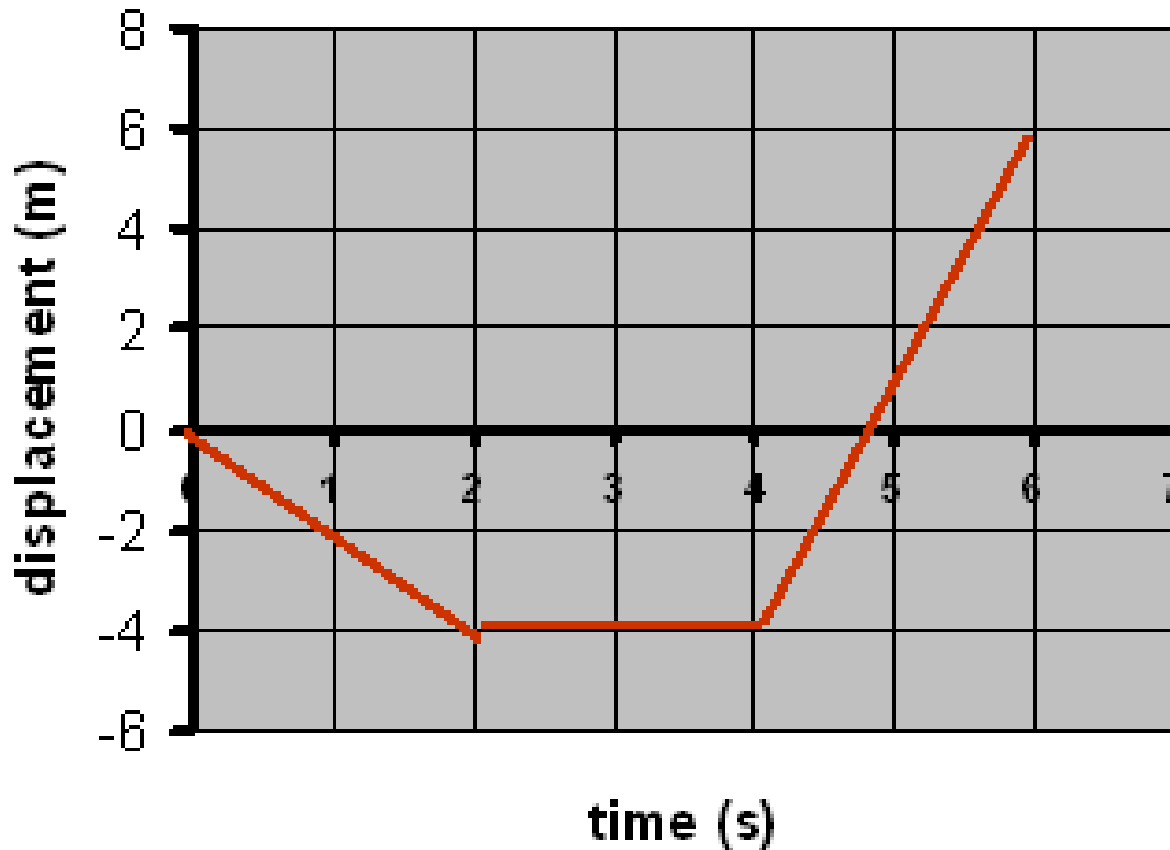
- ▶ Obtain information about the motion of an object through displacement–time graphs
 - ▶ Use the gradient of displacement–time graphs to determine the velocity of an object
- 

Displacement–time graphs



Shows how the displacement of an object changes over time

Displacement–time graphs



What is the displacement after 3 seconds?

-4 m

What is the displacement at 5 seconds?

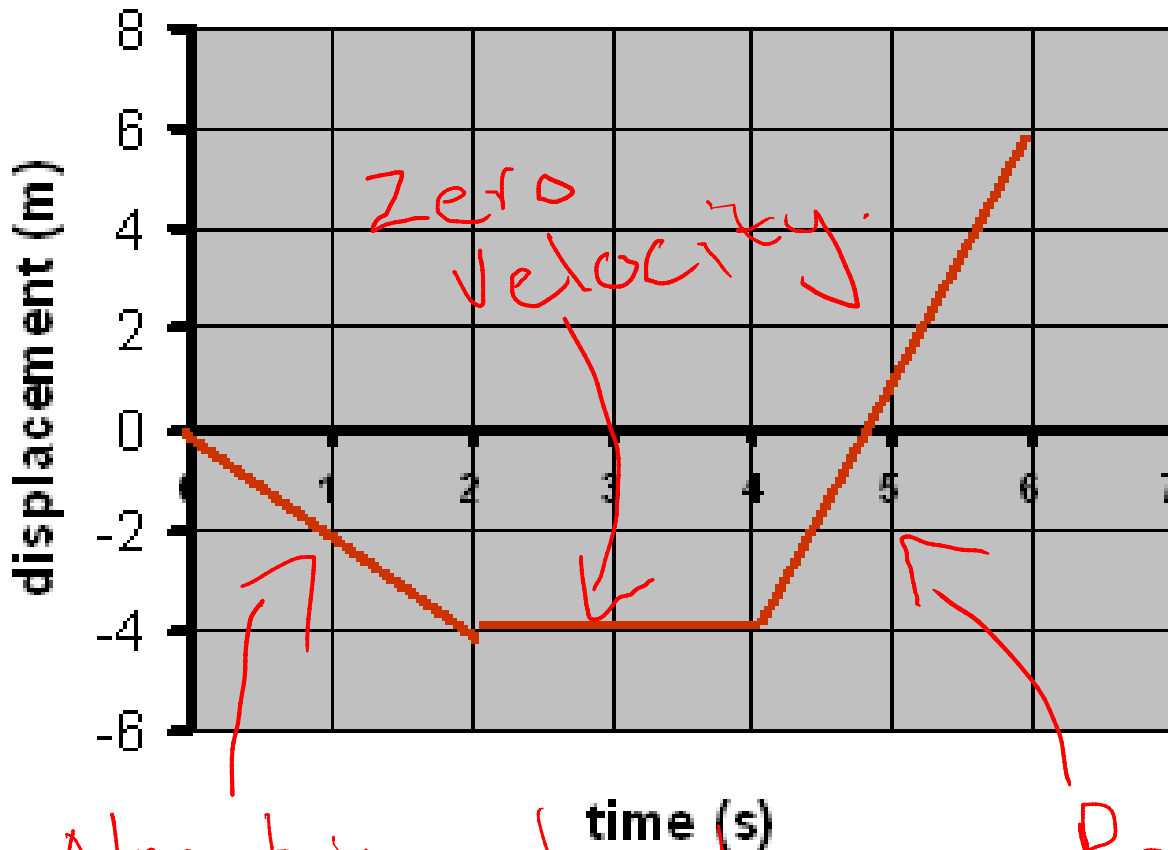
1 m

What is the displacement at the beginning of the journey?

0 m

Displacement–time graphs

$$\text{Gradient} = \frac{\text{rise}}{\text{run}} = \frac{\text{displacement}}{\text{time}} = \frac{s}{t} = v$$



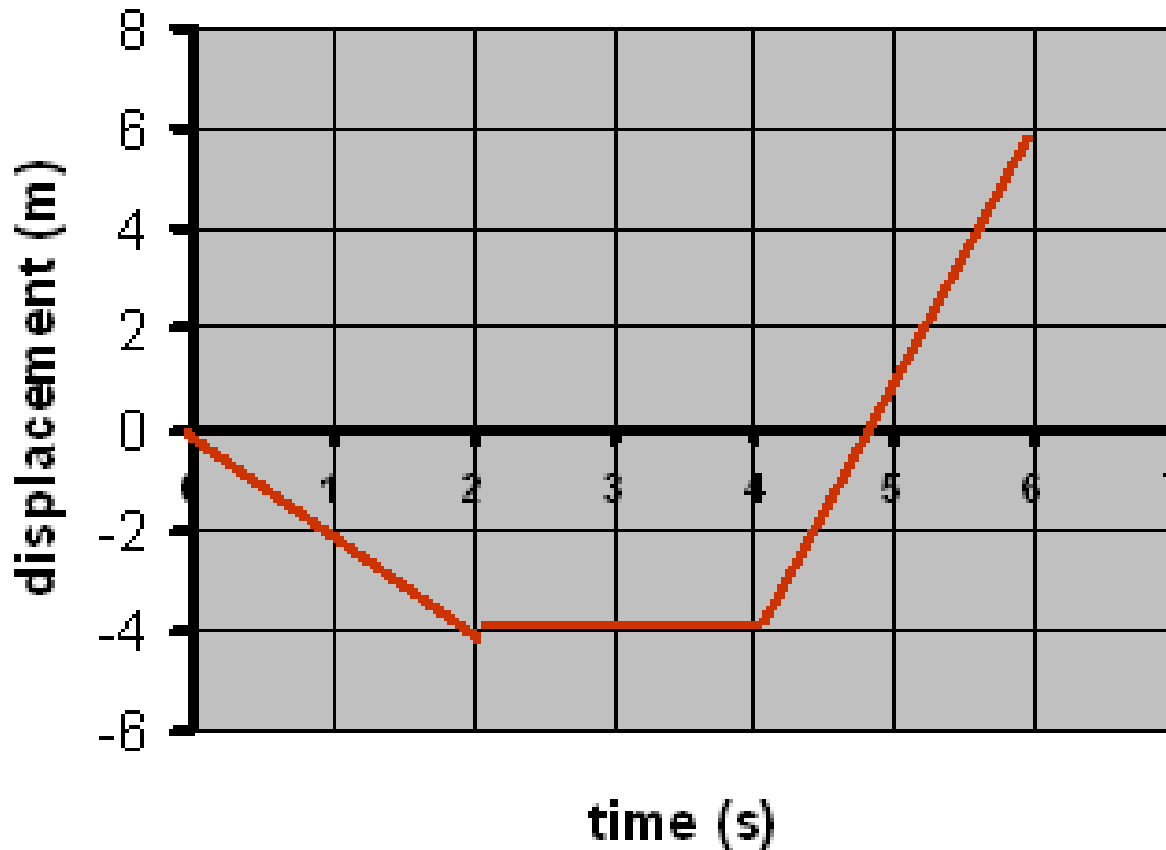
The gradient of a displacement time graph gives the velocity.

When the gradient changes, the velocity changes

Negative velocity

Positive velocity

Displacement–time graphs



What is the velocity at $t=0$?

$$v = \frac{\text{rise}}{\text{run}} = -\frac{4}{2} = -2\text{ms}^{-1}$$

What is the velocity at $t=3$?

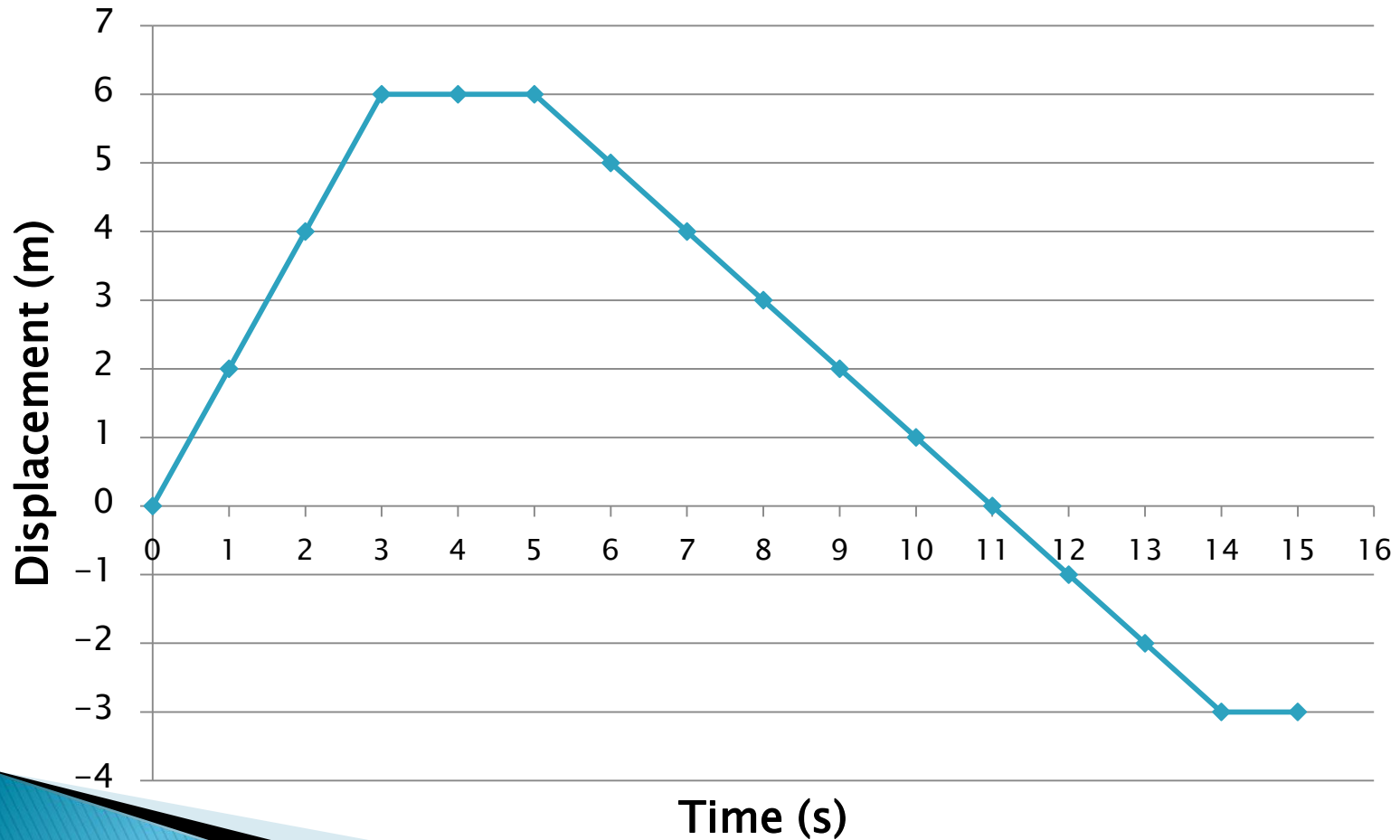
$$v = \frac{\text{rise}}{\text{run}} = \frac{0}{2} = 0\text{ms}^{-1}$$

What is the velocity after 5 seconds?

$$v = \frac{\text{rise}}{\text{run}} = \frac{10}{2} = 5\text{ms}^{-1}$$

Example

- ▶ 1) describe the motion presented in the graph
- ▶ 2) when did the object stop moving?
- ▶ 3) what was the velocity at 7 seconds?



Example

- ▶ 1) The object has a positive velocity for 3 seconds. It stopped for 2 seconds. It had a negative velocity for 9 seconds before stopping again.
- ▶ 2) The object was stopped between the 3rd and 5th second as well as after the 14th second
- ▶ 3) $v = \text{rise/run} = -9/9 = -1 \text{ m/s}$

Outcomes

- ▶ Obtain information about the motion of an object through displacement–time graphs
 - ▶ Use the gradient of displacement–time graphs to determine the velocity of an object
 - ▶ **Matthews and Winter Set 14 Q 1–3**
- 