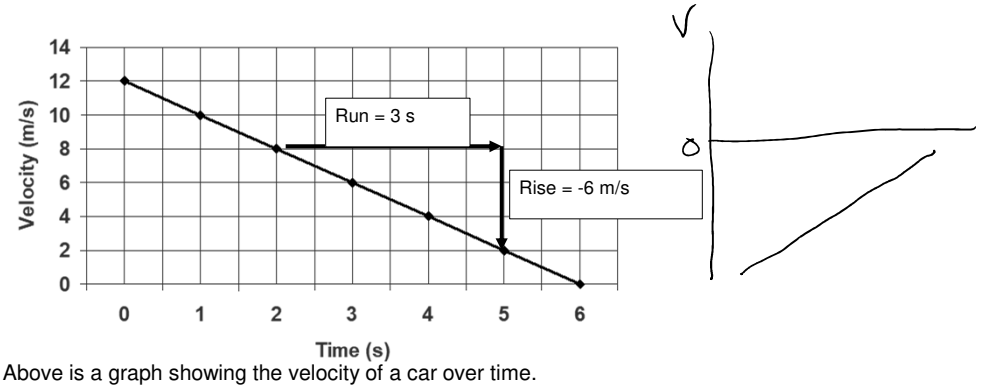
Velocity vs Time Graphs

1

Question



Above is a graph showing the velocity of a car over time.

1. How is the velocity of the car changing (speeding up, slowing down, or staying the same)? SLOWING DOWN
2. How do we know? VELOCITY IS APPROACHING ZERO
3. What do we call this? ACCELERATE

2

What is Acceleration?

The change in an object's velocity over time.

$$Acceleration = \frac{Change\ in\ velocity}{Change\ in\ time} = \frac{\Delta v}{\Delta t}$$

Units: $\frac{m/s}{s} = \frac{m}{s^2}$

$Acceleration = slope\ on\ a\ velocity\ vs.\ time\ graph$

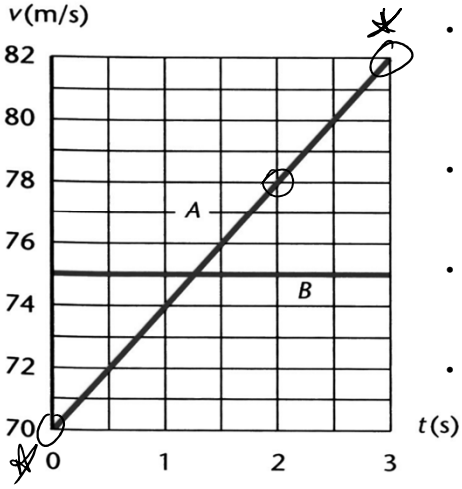
3

Velocity-Time Graphs

- **Shows the velocity of an object over time.**
  - **Slope tells you the acceleration of the object.**
  - **Area tells you the displacement of the object.**

4

Velocity Vs. Time Graphs.



- **What is the velocity of object A at 2 seconds?** 78 m/s
- **What is the acceleration of object A?**
  Slope $= \frac{\Delta y}{\Delta x} = \frac{\Delta v}{\Delta t} = \frac{82-70}{3-0} = \frac{12}{3} = 4\ m/s^2$
- **Describe the motion of object B.**
  Moving at a constant 75 m/s
- **What is the acceleration of object B?**
  Slope $= \frac{\Delta y}{\Delta x} = \frac{0}{3} = 0\ m/s$

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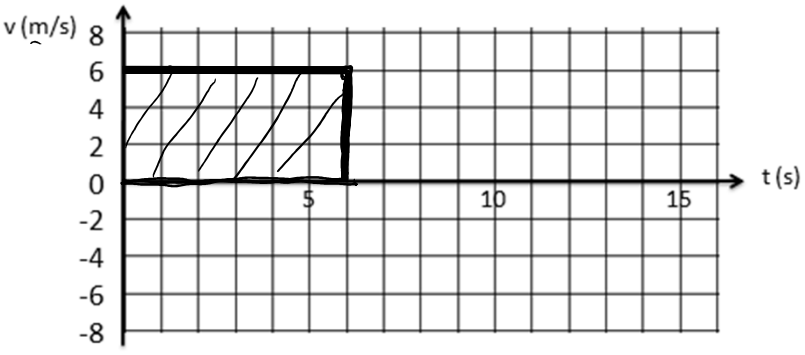
Finding Displacement on a Velocity–Time Graph



- **What is the displacement shown?**
  Area = L x W = 6 x 6 = 36 m

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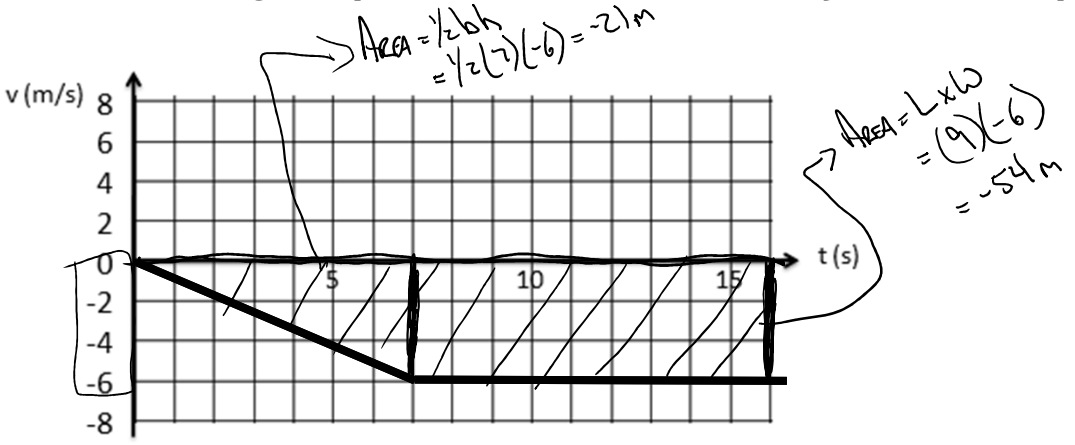
Finding Displacement on a Velocity–Time Graph



- **What is the displacement shown?**

(-21) + (-54) = -75m

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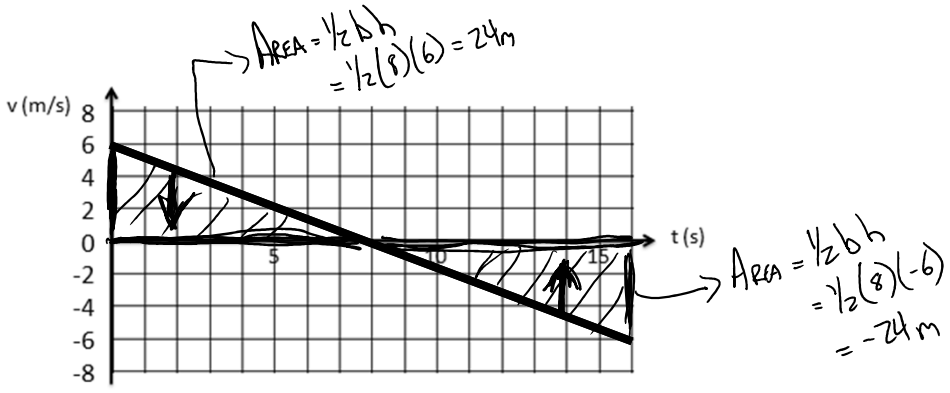
Finding Displacement on a Velocity–Time Graph



- **What is the displacement shown?**

= 24 + (-24) = 0m

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