

Velocity vs. time Graphs

① Direction (forward or backward) → Read graph

② Acceleration → $\frac{v}{t}$ → **SLOPE**

③ Displacement

- Area between graph & the t axis

• Rectangle = $A = \text{Base} \times \text{height}$

• Triangle = $A = \frac{1}{2} \text{Base} \times \text{height}$



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Chart Area

Velocity vs Time

Velocity (m/s)

Time (s)

Handwritten notes on the graph:

- $\text{slope} = \frac{0-6}{2-0} = \frac{-6}{2} = -3 \text{ m/s}$
- $\frac{0-6}{10-7} = 2$
- $\#6 = 6 + 6$

1) Describe the Motion described by the graph

A) When is the object moving forwards? 2-10s

B) When is the object moving backwards? 0-2s

C) When is the object at rest? 2-10s

2) What is the velocity of the object at t = 2 s? 0 m/s

3) What is the velocity of the object at t = 8 s? 4 m/s

4) What is the acceleration of the object at t = 2 s? 3 m/s²

5) What is the acceleration of the object at t = 8 s? 2 m/s²

6) What is the displacement of the object from t=0 to t=4s? 0m

7) What is the displacement of the object from t = 0 to t = 10 s? 27m

Graph Data Points:

Time (s)	Velocity (m/s)
0	-6
2	0
4	6
7	6
10	0

Area Calculations:

- 0-2s: Triangle with base 2, height 6. Area = $\frac{1}{2} \times 2 \times 6 = 6$ (shaded blue)
- 2-4s: Triangle with base 2, height 6. Area = $\frac{1}{2} \times 2 \times 6 = 6$ (shaded blue)
- 4-7s: Rectangle with base 3, height 6. Area = $3 \times 6 = 18$ (shaded blue)
- 7-10s: Triangle with base 3, height 6. Area = $\frac{1}{2} \times 3 \times 6 = 9$ (shaded blue)

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Chart Area Format Selection

Velocity (m/s)

Time (s)

Velocity vs Time

(x_1, y_1)
 $(6, 15)$

(x_2, y_2)
 $(9, -15)$

$t = 7.5\text{ s}$

22.5
11.25
15
-15-15
-10
3
3
9
6
12
3s
10m
fwd 48.75 - bckwd 26.25 = 22.5m

- Describe the Motion described by the graph
- When is the object moving forwards?
- When is the object moving backwards?
- When is the object at rest?
- What is the velocity of the object at $t = 2\text{ s}$?
- What is the velocity of the object at $t = 8\text{ s}$?
- What is the acceleration of the object at $t = 3\text{ s}$?
- What is the acceleration of the object at $t = 8\text{ s}$?
- What is the displacement of the object from $t = 0$ to $t = 4\text{ s}$?
- What is the displacement of the object from $t = 0$ to $t = 10\text{ s}$?

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