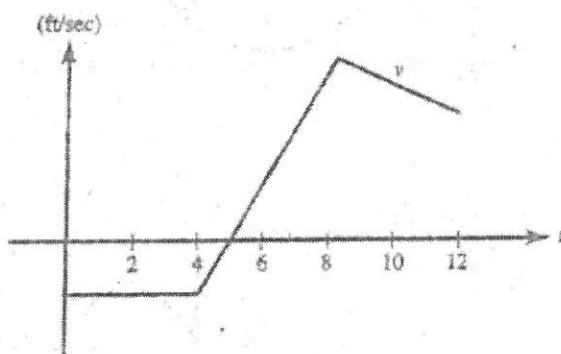


Motion Supplement

A particle is moving along the y axis such that its acceleration is given by the function $a(t) = 2t - 3$, where $t > 0$, $v(0) = 2$, and $p(0) = 1$.

- When is the particle moving to the right?
- When is the particle at $y = 2$?
- What is the particle's velocity when it is at $y = 2$?
- How far does the particle travel from $t = 0$ to $t = 2$?

The graph for Questions 82 and 83 shows the velocity of an object moving along a straight line during the time interval $0 \leq t \leq 12$.

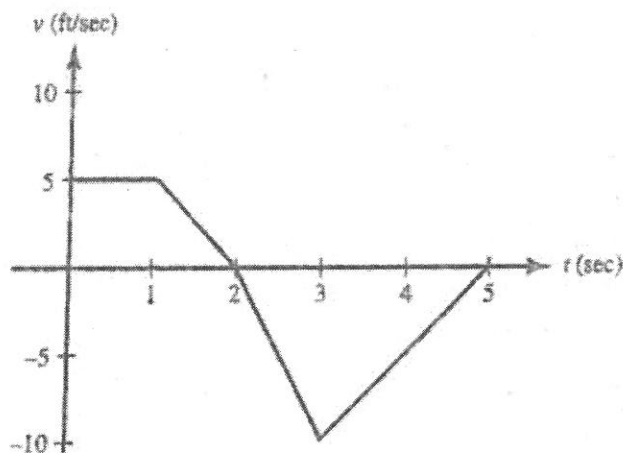


- For what t does this object attain its maximum acceleration?

(A) $0 < t < 4$ (B) $4 < t < 8$ (C) $t = 5$ (D) $t = 8$ (E) $t = 12$
- The object reverses direction at $t =$

(A) 4 only (B) 5 only (C) 8 only
(D) 5 and 8 (E) none of these

Use the graph shown for Questions 57–63. It shows the velocity of an object moving along a straight line during the time interval $0 \leq t \leq 5$.



57. The object attains its maximum speed when $t =$
 (A) 0 (B) 1 (C) 2 (D) 3 (E) 5
58. The speed of the object is increasing during the time interval
 (A) (0,1) (B) (1,2) (C) (0,2) (D) (2,3) (E) (3,5)
59. The acceleration of the object is positive during the time interval
 (A) (0,1) (B) (1,2) (C) (0,2) (D) (2,3) (E) (3,5)
60. How many times on $0 < t < 5$ is the object's acceleration undefined?
 (A) none (B) 1 (C) 2 (D) 3 (E) more than 3
61. During $2 < t < 3$ the object's acceleration (in ft/sec^2) is
 (A) -10 (B) -5 (C) 0 (D) 5 (E) 10
62. The object is furthest to the right when $t =$
 (A) 0 (B) 1 (C) 2 (D) 3 (E) 5
63. The object's average acceleration (in ft/sec^2) for the interval $0 \leq t \leq 3$ is
 (A) -15 (B) -5 (C) -3 (D) -1 (E) none of these

1. On planet 2, acceleration due to gravity is $-7.2 \text{ m}/\text{s}^2$. object is dropped from a cliff and hits the planet's surface 4 seconds later.

Motion Supplement

A particle is moving along the y axis such that its acceleration is given by the function $a(t) = 2t - 3$, where $t > 0$, $v(0) = 2$, and $p(0) = 1$.

- a. When is the particle moving to the right?

$(0, 1) \quad (2, \infty)$

$$v = t^2 - 3t + 2$$

$$p = \frac{1}{3}t^3 - \frac{3}{2}t^2 + 2t + 1$$

$\begin{array}{c} + \quad - \quad + \\ \hline 1 \quad 2 \quad t-1 \quad t-2 \end{array}$

- b. When is the particle at $y = -2$?

$t = 2.678$

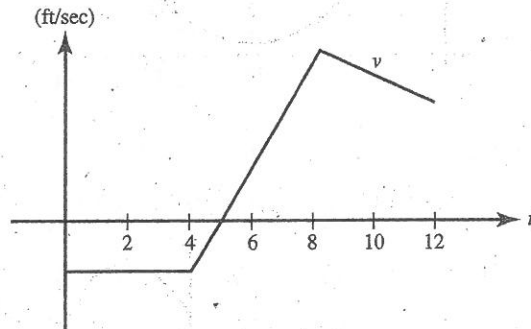
- c. What is the particle's velocity when it is at $y = 2$?

$v(2.678) = 1.138 \text{ units/unit}$

- d. How far does the particle travel from $t = 0$ to $t = 2$?

$\int_0^2 (t^2 - 3t + 2) dt = 1$

The graph for Questions 82 and 83 shows the velocity of an object moving along a straight line during the time interval $0 \leq t \leq 12$.



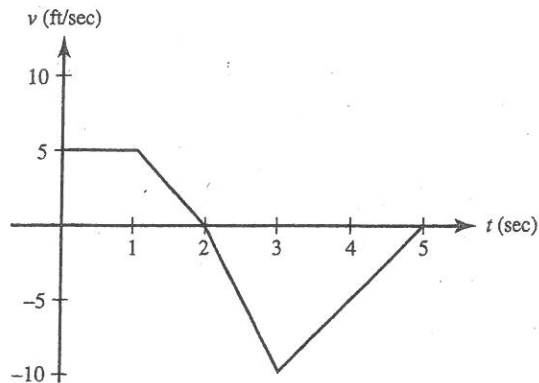
82. For what t does this object attain its maximum acceleration?

(A) $0 < t < 4$ (B) $4 < t < 8$ (C) $t = 5$ (D) $t = 8$ (E) $t = 12$

83. The object reverses direction at $t =$

(A) 4 only (B) 5 only (C) 8 only
(D) 5 and 8 (E) none of these

Use the graph shown for Questions 57–63. It shows the velocity of an object moving along a straight line during the time interval $0 \leq t \leq 5$.



57. The object attains its maximum speed when $t =$
 (A) 0 (B) 1 (C) 2 (D) 3 (E) 5
58. The speed of the object is increasing during the time interval
 (A) (0,1) (B) (1,2) (C) (0,2) (D) (2,3) (E) (3,5)
59. The acceleration of the object is positive during the time interval
 (A) (0,1) (B) (1,2) (C) (0,2) (D) (2,3) (E) (3,5)
60. How many times on $0 < t < 5$ is the object's acceleration undefined?
 (A) none (B) 1 (C) 2 (D) 3 (E) more than 3
61. During $2 < t < 3$ the object's acceleration (in ft/sec^2) is
 (A) -10 (B) -5 (C) 0 (D) 5 (E) 10
62. The object is furthest to the right when $t =$
 (A) 0 (B) 1 (C) 2 (D) 3 (E) 5
63. The object's average acceleration (in ft/sec^2) for the interval $0 \leq t \leq 3$ is
 (A) -15 (B) -5 (C) -3 (D) -1 (E) none of these