

Derivatives as Rates of Change

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The function $s = f(t)$ gives the position of a body moving on a coordinate line, with s in meters and t in seconds.

1) $s = 2t^2 + 4t + 6, 0 \leq t \leq 2$ 1) _____

Find the body's speed and acceleration at the end of the time interval.

- A) 8 m/sec, 2 m/sec^2 B) 18 m/sec, 4 m/sec^2
C) 12 m/sec, 8 m/sec^2 D) 12 m/sec, 4 m/sec^2

2) $s = 3t - t^2, 0 \leq t \leq 3$ 2) _____

Find the body's speed and acceleration at the end of the time interval.

- A) 3 m/sec, -6 m/sec^2 B) 3 m/sec, -2 m/sec^2
C) -3 m/sec , -2 m/sec^2 D) 9 m/sec, -6 m/sec^2

3) $s = -t^3 + 8t^2 - 8t, 0 \leq t \leq 8$ 3) _____

Find the body's speed and acceleration at the end of the time interval.

- A) 8 m/sec, 0 m/sec^2 B) 72 m/sec, -32 m/sec^2
C) -72 m/sec , -32 m/sec^2 D) 72 m/sec, -8 m/sec^2

Solve the problem.

4) The driver of a car traveling at 36 ft/sec suddenly applies the brakes. The position of the car is 4) _____

$s = 36t - 3t^2$, t seconds after the driver applies the brakes. How far does the car go before coming to a stop?

- A) 216 ft B) 108 ft C) 432 ft D) 6 ft

5) The driver of a car traveling at 30 ft/sec suddenly applies the brakes. The position of the car is 5) _____

$s = 30t - 3t^2$, t seconds after the driver applies the brakes. How many seconds after the driver applies the brakes does the car come to a stop?

- A) 30 sec B) 15 sec C) 5 sec D) 10 sec

6) A ball dropped from the top of a building has a height of $s = 256 - 16t^2$ meters after t seconds. 6) _____

How long does it take the ball to reach the ground? What is the ball's velocity at the moment of impact?

- A) 4 sec, -128 m/sec B) 16 sec, -512 m/sec
C) 4 sec, 128 m/sec D) 8 sec, -64 m/sec

7) A ball dropped from the top of a building has a height of $s = 144 - 16t^2$ meters after t seconds. 7) _____

How long does it take the ball to reach the ground? What is the ball's velocity at the moment of impact?

- A) 3 sec, -96 m/sec B) 6 sec, -48 m/sec
C) 9 sec, -288 m/sec D) 3 sec, 96 m/sec

8) A rock is thrown vertically upward from the surface of an airless planet. It reaches a height of 8) _____

$s = 120t - 6t^2$ meters in t seconds. How high does the rock go? How long does it take the rock to reach its highest point?

- A) 600 m, 10 sec B) 1200 m, 20 sec C) 2280 m, 20 sec D) 1190 m, 10 sec

Answer Key

Testname: DERIVATIVES AS RATES OF CHANGE

- 1) D
- 2) B
- 3) B
- 4) B
- 5) C
- 6) A
- 7) A
- 8) A