

## Initial-Value Problems

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

**Solve the initial value problem.**

1)  $\frac{ds}{dt} = \cos t - \sin t, s\left(\frac{\pi}{2}\right) = 6$  1) \_\_\_\_\_

A)  $s = \sin t - \cos t + 5$

B)  $s = \sin t + \cos t + 7$

C)  $s = 2\sin t + 4$

D)  $s = \sin t + \cos t + 5$

2)  $\frac{ds}{dt} = \cos t - \sin t, s\left(\frac{\pi}{2}\right) = 11$  2) \_\_\_\_\_

A)  $s = 2\sin t + 9$

B)  $s = \sin t + \cos t + 10$

C)  $s = \sin t - \cos t + 10$

D)  $s = \sin t + \cos t + 12$

3)  $\frac{dy}{dx} = \frac{1}{x^3} + x, x > 0; y(1) = 2$  3) \_\_\_\_\_

A)  $y = -\frac{1}{2x^2} + \frac{x^2}{2} + 2$

B)  $y = \frac{-1}{2x^2} + \frac{x^2}{2}$

C)  $y = -\frac{1}{2x^2} + \frac{5}{2}$

D)  $y = \frac{4}{x^4} + \frac{x^2}{2} - \frac{5}{2}$

4)  $\frac{dy}{dx} = \frac{1}{x^3} + x, x > 0; y(1) = 3$  4) \_\_\_\_\_

A)  $y = \frac{-1}{2x^2} + \frac{x^2}{2}$

B)  $y = -\frac{1}{2x^2} + \frac{7}{2}$

C)  $y = -\frac{1}{2x^2} + \frac{x^2}{2} + 3$

D)  $y = \frac{4}{x^4} + \frac{x^2}{2} - \frac{3}{2}$

5)  $\frac{dy}{dx} = \frac{1}{2\sqrt{x}} + 5, y(4) = 5$  5) \_\_\_\_\_

A)  $y = \frac{-1}{4}\sqrt{x} + 5x - \frac{29}{2}$

B)  $y = \sqrt{x} + 5x - 17$

C)  $y = \frac{1}{\sqrt{x}} + 5x - \frac{31}{2}$

D)  $y = \sqrt{x} + 5x + 27$

6)  $\frac{dy}{dx} = \frac{1}{2\sqrt{x}} + 3, y(1) = -3$  6) \_\_\_\_\_

A)  $y = \frac{1}{\sqrt{x}} + 3x - 7$

B)  $y = \frac{-1}{4}\sqrt{x} + 3x - \frac{23}{4}$

C)  $y = \sqrt{x} + 3x - 7$

D)  $y = \sqrt{x} + 3x + 1$

7)  $\frac{d^2y}{dx^2} = 5 - 3x, y'(0) = 8, y(0) = 2$  7) \_\_\_\_\_

A)  $y = \frac{5}{2}x^2 - \frac{1}{2}x^3 + 8x + 2$

B)  $y = \frac{5}{2}x^2 + \frac{1}{2}x^3 - 8x - 2$

C)  $y = 2$

D)  $y = 5x^2 + 3x^3 + 8x + 2$

8)  $\frac{d^2y}{dx^2} = 4 - 2x, y'(0) = 8, y(0) = 2$  8) \_\_\_\_\_

A)  $y = 2$

B)  $y = 4x^2 + 2x^3 + 8x + 2$

C)  $y = 2x^2 - \frac{1}{3}x^3 + 8x + 2$

D)  $y = 2x^2 + \frac{1}{3}x^3 - 8x - 2$

**Solve the problem.**

9) Given the velocity and initial position of a body moving along a coordinate line at time  $t$ , find the body's position at time  $t$ . 9) \_\_\_\_\_

$v = -14t + 10, s(0) = 11$

A)  $s = -7t^2 + 10t + 11$

B)  $s = -14t^2 + 10t + 11$

C)  $s = -7t^2 + 10t - 11$

D)  $s = 7t^2 + 10t - 11$

10) Given the velocity and initial position of a body moving along a coordinate line at time  $t$ , find the body's position at time  $t$ . 10) \_\_\_\_\_

$v = -15t + 3, s(0) = 10$

A)  $s = -\frac{15}{2}t^2 + 3t - 10$

B)  $s = -\frac{15}{2}t^2 + 3t + 10$

C)  $s = -15t^2 + 3t + 10$

D)  $s = \frac{15}{2}t^2 + 3t - 10$

11) Given the acceleration, initial velocity, and initial position of a body moving along a coordinate line at time  $t$ , find the body's position at time  $t$ . 11) \_\_\_\_\_

$a = 20, v(0) = 17, s(0) = 3$

A)  $s = 10t^2 + 17t + 3$

B)  $s = 20t^2 + 17t + 3$

C)  $s = -10t^2 - 17t + 3$

D)  $s = 10t^2 + 17t$

12) Given the acceleration, initial velocity, and initial position of a body moving along a coordinate line at time  $t$ , find the body's position at time  $t$ . 12) \_\_\_\_\_

$$a = 10, v(0) = 11, s(0) = 2$$

A)  $s = -5t^2 - 11t + 2$

B)  $s = 5t^2 + 11t$

C)  $s = 5t^2 + 11t + 2$

D)  $s = 10t^2 + 11t + 2$

Answer Key

Testname: INITIAL-VALUE PROBLEMS

- 1) D
- 2) B
- 3) A
- 4) C
- 5) B
- 6) C
- 7) A
- 8) C
- 9) A
- 10) B
- 11) A
- 12) C