

Find the derivative.

$$1) y = 2x^2 + 11x + 5x^{-3}$$

Find the second derivative.

$$2) w = z^{-4} - \frac{1}{z}$$

Find the derivative of the function.

$$3) y = (5x - 5)(5x + 1)$$

$$4) y = \left(\frac{1}{x} + 1\right)\left(x - \frac{1}{x} + 1\right)$$

$$5) y = \frac{x^3}{x - 1}$$

$$6) y = \frac{x^2 + 8x + 3}{\sqrt{x}}$$

$$7) y = \frac{(x + 3)(x + 2)}{(x - 3)(x - 2)}$$

$$8) y = x^{1/6}$$

$$9) y = 7x^2e^{-x}$$

$$10) s = \frac{t^6 + 6t + 5}{t^2}$$

Suppose u and v are differentiable functions of x . Find the value of the indicated derivative.

$$11) u(1) = 3, u'(1) = -6, v(1) = 7, v'(1) = -2.$$

$$\frac{d}{dx}(uv) \text{ at } x = 1$$

$$12) \text{ Find an equation for the tangent to the curve } y = \frac{8x}{x^2 + 1} \text{ at the point } (1, 4).$$

$$13) \text{ Find all points } (x, y) \text{ on the graph of } y = \frac{x}{(x - 4)} \text{ with tangent lines perpendicular to the line } y = 4x - 5.$$

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

$$14) s = 7t^2 + 4t + 9, 0 \leq t \leq 2$$

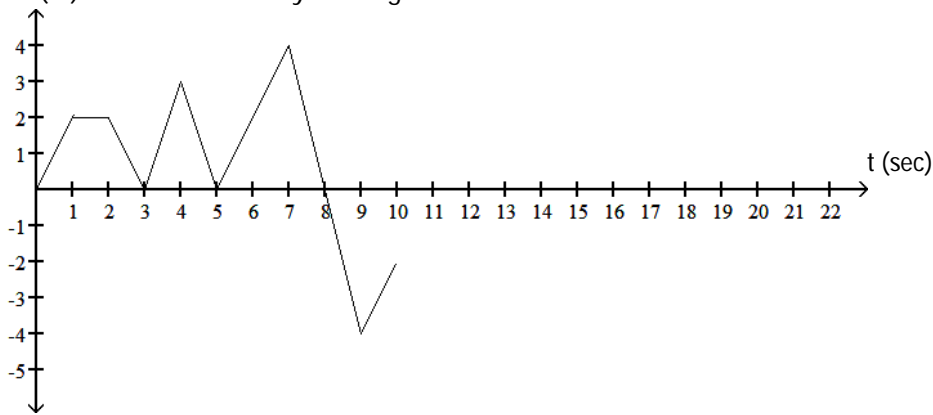
Find the body's displacement and average velocity for the given time interval.

15) $s = 7t^2 + 2t + 8, 0 \leq t \leq 2$

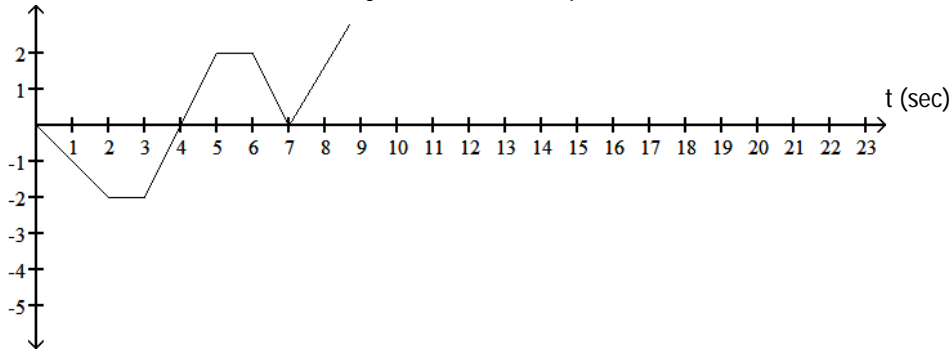
Find the body's speed and acceleration at the end of the time interval.

The figure shows the velocity v or position s of a body moving along a coordinate line as a function of time t .

16) s (m) When is the body moving forward?



17) v (ft/sec) When is the body's acceleration equal to zero?



18) The position of a body moving on a coordinate line is given by $s = t^2 - 8t + 5$, with s in meters and t in seconds. When, if ever, during the interval $0 \leq t \leq 8$ does the body change direction?

19) At time t , the position of a body moving along the s -axis is $s = t^3 - 21t^2 + 144t$ m. Find the body's acceleration each time the velocity is zero.

20) At time t , the position of a body moving along the s -axis is $s = t^3 - 15t^2 + 48t$ m. Find the total distance traveled by the body from $t = 0$ to $t = 3$.

21) At time $t \geq 0$, the velocity of a body moving along the s -axis is $v = t^2 - 8t + 7$. When is the body moving backward?

22) At time $t \geq 0$, the velocity of a body moving along the s -axis is $v = t^2 - 6t + 5$. When is the body's velocity increasing?

Answer Key

Testname: PRACTICE06

1) $4x + 11 - 15x^{-4}$

2) $20z^{-6} - \frac{2}{z^3}$

3) $50x - 20$

4) $\frac{2}{x^3} + 1$

5) $y' = \frac{2x^3 - 3x^2}{(x - 1)^2}$

6) $y' = \frac{3x^2 + 8x - 3}{2x^{3/2}}$

7) $y' = \frac{-10x^2 + 60}{(x - 3)^2(x - 2)^2}$

8) $\frac{1}{6}x^{-5/6}$

9) $7xe^{-x}(2 - x)$

10) $\frac{ds}{dt} = 4t^3 - \frac{6}{t^2} - \frac{10}{t^3}$

11) -48

12) $y = 4$

13) $(0, 0), (8, 2)$

14) $36 \text{ m}, 18 \text{ m/sec}$

15) $30 \text{ m/sec}, 14 \text{ m/sec}^2$

16) $0 < t < 1, 3 < t < 4, 5 < t < 7, 9 < t < 10$

17) $2 < t < 3, 5 < t < 6$

18) $t = 4 \text{ sec}$

19) $a(6) = -6 \text{ m/sec}^2, a(8) = 6 \text{ m/sec}^2$

20) 52 m

21) $1 < t < 7$

22) $t > 3$