

Name \_\_\_\_\_ B

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

**Find the slope of the line tangent to the graph at the given point.**

- 1)  $y = \frac{6}{3 + x^2}, x = 7$  1) \_\_\_\_\_
- A)  $m = -\frac{3}{50}$       B)  $m = -\frac{3}{5}$       C)  $m = \frac{3}{5}$       D)  $m = \frac{3}{50}$

**Find the second derivative.**

- 2)  $y = \frac{23x^3}{6} - 8$  2) \_\_\_\_\_
- A)  $23x$       B)  $\frac{23}{6}x$       C)  $\frac{23}{2}x^2$       D)  $23x - 8$

**Solve the problem.**

- 3) The number of gallons of water in a swimming pool  $t$  minutes after the pool has started to drain is  $(t) = 50(20 - x)^2$ . How fast is the water running out at the end of 15 minutes? 3) \_\_\_\_\_
- A) 1250 gal/min      B) 625 gal/min      C) 250 gal/min      D) 500 gal/min

**Find the second derivative of the function.**

- 4)  $y = \frac{(x - 8)(x^2 + 3x)}{x^3}$  4) \_\_\_\_\_
- A)  $\frac{d^2y}{dx^2} = -\frac{10}{x^3} - \frac{144}{x^2}$       B)  $\frac{d^2y}{dx^2} = -\frac{10}{x^3} - \frac{144}{x^4}$
- C)  $\frac{d^2y}{dx^2} = \frac{5}{x^2} + \frac{48}{x^3}$       D)  $\frac{d^2y}{dx^2} = \frac{10}{x^3} + \frac{144}{x^4}$

**Find the derivative.**

- 5)  $y = \frac{10}{x} + 5 \sec x$  5) \_\_\_\_\_
- A)  $y' = -\frac{10}{x^2} + 5 \sec x \tan x$       B)  $y' = \frac{10}{x^2} - 5 \sec x \tan x$
- C)  $y' = -\frac{10}{x^2} + 5 \tan^2 x$       D)  $y' = -\frac{10}{x^2} - 5 \csc x$

**Solve the problem.**

- 6) Find the tangent to  $y = 2 - \sin x$  at  $x = \pi$ . 6) \_\_\_\_\_
- A)  $y = x - 2$       B)  $y = -x + 2$       C)  $y = -x + \pi - 2$       D)  $y = x - \pi + 2$

**Find the indicated derivative.**

- 7) Find  $y''$  if  $y = 6x \sin x$ . 7) \_\_\_\_\_
- A)  $y'' = -12 \cos x + 6x \sin x$       B)  $y'' = 6 \cos x - 12x \sin x$
- C)  $y'' = 12 \cos x - 6x \sin x$       D)  $y'' = -6x \sin x$

Suppose that the functions  $f$  and  $g$  and their derivatives with respect to  $x$  have the following values at the given values of  $x$ . Find the derivative with respect to  $x$  of the given combination at the given value of  $x$ .

8)  $\frac{x|f(x) \ g(x) \ f'(x) \ g'(x)|}{3B \ 1 \ 9 \ 6B \ 3B}$  8) \_\_\_\_\_  
 $\frac{4B \ 3 \ 3B \ 2B \ -6B}{}$

$\sqrt{f(x) + g(x)}, x = 3B$

A)  $\frac{1}{2\sqrt{10B}}$

)  $\frac{9}{2\sqrt{10B}}$

)  $\frac{9}{\sqrt{10B}}$

D)  $-\frac{1}{2\sqrt{10B}}$

Find the derivative of the function.

9)  $h(x) = \left(\frac{\cos x}{1 + \sin x}\right)^5$  9) \_\_\_\_\_

A)  $5\left(\frac{\cos x}{1 + \sin x}\right)^4$

B)  $\frac{-5 \cos^4 x}{(1 + \sin x)^5}$

)  $\left(-\frac{4 \sin x}{\cos x}\right)\left(\frac{\cos x}{1 + \sin x}\right)^4$

D)  $-5\left(\frac{\sin x}{\cos x}\right)^4$

Find  $dy/dt$ .

10)  $y = t^4(t^5 - 9)^5$  10) \_\_\_\_\_

A)  $t^4(t^5 - 9)^4(29t^4 - 36)$

B)  $t^3(t^5 - 9)^4(29t^5 - 36)$

)  $4t^3(t^5 - 9)^4(25t^5 - 9)$

D)  $100t^{18}(t^5 - 9)^4$

Find  $\frac{2y}{x^2} \frac{dy}{dx}$  for the given function.

11)  $y = \sqrt[3]{9x + 6}$  11) \_\_\_\_\_

A)  $-\frac{1}{4(9x + 6)^{3/2}}$

B)  $\frac{9}{2\sqrt[3]{9x + 6}}$

)  $-\frac{81\sqrt[3]{9x + 6}}{4B}$

D)  $-\frac{81}{4(9x + 6)^{3/2}}$

Solve the problem.

12) The position of a particle moving along a coordinate line is  $s = \sqrt{2 + 2t}$  with  $s$  in meters and  $t$  in seconds. Find the particle's acceleration at  $t = 1$  sec. 12) \_\_\_\_\_

A)  $-\frac{1}{16} \text{ m/sec}^2$

B)  $\frac{1}{2} \text{ m/sec}^2$

)  $\frac{1}{8} \text{ m/sec}^2$

D)  $-\frac{1}{8} \text{ m/sec}^2$