Chapter 3 Practice Test

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

1) The function $V = 3\pi r^2$ describes the volume of a right circular cylinder of height 3 feet and   1) _____
radius r feet. Find the (instantaneous)rate of change of the volume with respect to the
radius when $r = 5$. Leave answer in terms of π.

Find dy/dx.

2) $s = t^6 \tan t$ 2) _____

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

3) $s = -6 + 3 \cos t$ 3) _____
Find the body's jerk at time $t = \pi/3$ sec.

Find the indicated derivative.

4) Find y'' if $y = -8 \cos x$.   4) _____

Find dy/dx.

5) $y = \sqrt{6 + \sin 2x}$ 5) _____

Find the value of (f · g)′ at the given value of x.

6) $f(u) = \dfrac{u - 1}{u + 1}$, $u = g(x) = \sqrt{x}$, $x = 64$ 6) _____

7) $f(u) = \dfrac{1}{\cos^2 u} - u$, $u = g(x) = \pi x$, $x = 10$ 7) _____

Find dy/dx by implicit differentiation. If applicable, express the result in terms of x and y.

8) $\cos xy + x^3 = y^3$ 8) _____

Find dy/dx.

9) $y = \sqrt[7]{x^{-2}}$ 9) _____

Find the derivative of the given function.

10) $y = \tan^{-1} \sqrt{3x}$ 10) _____

Find dy/dx.

11) $f(x) = -4e^{3x}$ 11) _____

12) $y = 11^{-x}$ 12) _____

13) $y = \ln (x - 2)$ 13) _____

Use logarithmic differentiation to find dy/dx.

    14) $y = 12^{9x}$

14) _____

Find f'(x) and state the domain of f'(x).

    15) $f(x) = \log_4 \sqrt{7x + 6}$

15) _____

Solve the problem.

    16) Suppose that the amount in grams of a radioactive substance present at time t (in years) is given by $A(t) = 160e^{-.70t}$. Find the rate of decay of the quantity present at the time when t = 4.

16) _____

1) 30π ft^3/ft

2) $t^6 \sec^2 t + 6t^5 \tan t$

3) $\dfrac{3\sqrt{3}}{2}$ m/sec^3

4) $y'' = 8\cos x$

5) $\dfrac{1\cos 2x}{\sqrt{6 + \sin 2x}}$

6) $\dfrac{1}{648}$

7) $-\pi$

8) $\dfrac{3x^2 - y\sin xy}{3y^2 + x\sin xy}$

9) $\dfrac{dy}{dx} = -\dfrac{2}{7}x^{-9/7}$

10) $\dfrac{3}{2(1 + 3x)\sqrt{3x}}$

11) $-12e^{3x}$

12) $-\ln 11\,(11^{-x})$

13) $\dfrac{1}{x - 2}$

14) $9\,(\ln 12)\,12^{9x}$

15) $\dfrac{7}{2(\ln 4)(7x + 6)};\ x > -\dfrac{6}{7}$

16) -6.8 grams per year