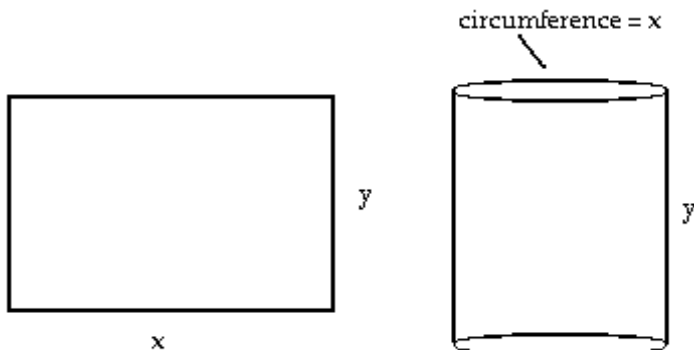


Name _____ Date _____ Period _____

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

Solve the problem.

- 1) A rectangular sheet of perimeter 33 cm and dimensions x cm by y cm is to be rolled into a cylinder as shown in part (a) of the figure. What values of x and y give the largest volume? 1) _____



- A) $x = 13$ cm; $y = \frac{7}{2}$ cm
 B) $x = 12$ cm; $y = \frac{9}{2}$ cm
 C) $x = 11$ cm; $y = \frac{11}{2}$ cm
 D) $x = 10$ cm; $y = \frac{13}{2}$ cm

Use the First or Second Derivative Test to determine the local extrema of the function, and identify any absolute extrema.

- 2) $y = xe^{2x}$ 2) _____

- A) Absolute maximum at $\left(-\frac{1}{2}, -\frac{e}{2}\right)$
 B) Absolute minimum at $\left(-\frac{1}{2}, -\frac{1}{2e}\right)$
 C) Absolute maximum at $\left(\frac{1}{2}, \frac{1}{2e}\right)$
 D) Absolute minimum at $\left(\frac{1}{2}, \frac{e}{2}\right)$

Find the points of inflection.

- 3) $y = x\sqrt{7 - x^2}$ 3) _____

- A) (0, 0)
 B) (0, 7)
 C) No inflection points.
 D) (7, 0)

Give an appropriate answer.

- 4) Find the value or values of c that satisfy $\frac{f(b) - f(a)}{b - a} = f'(c)$ for the function $f(x) = x + \frac{48}{x}$ on the 4) _____

interval $[3, 16]$.

- A) $0, 4\sqrt{3}$
 B) 3, 16
 C) $4\sqrt{3}$
 D) $-4\sqrt{3}, 4\sqrt{3}$

Find dy/dx .

- 5) $y = 7xe^x - 7e^x$ 5) _____

- A) $7xe^x + 14e^x$
 B) $7xe^x$
 C) $7e^x$
 D) $7x$

6) $y = \ln(\ln 5x)$

A) $\frac{1}{5x}$

B) $\frac{1}{x}$

C) $\frac{1}{\ln 5x}$

D) $\frac{1}{x \ln 5x}$

6) _____

Use logarithmic differentiation to find dy/dx .

7) $y = 22^{-x}$

A) -22^{-x}

B) $-\ln 22 (22^{-x})$

C) 22^{-x}

D) $\ln 22 (22^{-x})$

7) _____

Find the derivative of the given function.

8) $y = \tan^{-1} \sqrt{5x}$

A) $\frac{5}{2(1+5x)\sqrt{5x}}$

B) $\frac{1}{1+5x}$

C) $\frac{1}{10\sqrt{5x}(1+5x)}$

D) $\frac{1}{\sqrt{1-5x}}$

8) _____

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

9) $\cos xy + x^5 = y^5$

A) $\frac{5x^4 - y \sin xy}{5y^4 + x \sin xy}$

B) $\frac{5x^4 + x \sin xy}{5y^4}$

C) $\frac{5x^4 - x \sin xy}{5y^4}$

D) $\frac{5x^4 + y \sin xy}{5y^4 - x \sin xy}$

9) _____

Find dy/dx .

10) $y = 6 \sec^3 x$

A) $18 \tan x \sec^3 x$

B) $18 \tan^2 x \sec^2 x$

C) $18 \sec^2 x$

D) $18 \tan^2 x \sec^3 x$

10) _____

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 .

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
3	1	16	8	3
4	-3	3	5	-4

11)

11) _____

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

A) $-\frac{1}{2\sqrt{17}}$

B) $\frac{11}{\sqrt{17}}$

C) $\frac{1}{2\sqrt{17}}$

D) $\frac{11}{2\sqrt{17}}$

Solve the problem.

12) At time t , the position of a body moving along the s -axis is $s = t^3 - 27t^2 + 240t$ m. Find the body's acceleration each time the velocity is zero.

12) _____

A) $a(10) = 6 \text{ m/sec}^2, a(8) = -6 \text{ m/sec}^2$

B) $a(10) = 0 \text{ m/sec}^2, a(8) = 0 \text{ m/sec}^2$

C) $a(20) = 120 \text{ m/sec}^2, a(16) = 20 \text{ m/sec}^2$

D) $a(10) = -6 \text{ m/sec}^2, a(8) = 6 \text{ m/sec}^2$

Find the value of $(f \circ g)'$ at the given value of x .

13) $f(u) = \frac{1}{u}, u = g(x) = 7x - x^2, x = 1$

13) _____

A) $-\frac{1}{5}$

B) $\frac{5}{36}$

C) $-\frac{5}{36}$

D) $\frac{1}{5}$

Find the horizontal tangents of the curve.

14) $y = x^4 - 2x^2 + 1$

A) At $x = 1, -1,$

B) At $x = 0, 1$

C) At $x = 0, 1, -1$

D) At $x = 0$

14) _____

Find dy/dx .

15) $y = \frac{7x - 8}{8x^2 + 3}$

A) $\frac{-56x^2 + 107x + 45}{(8x^2 + 3)^2}$

B) $\frac{-56x^2 + 128x + 21}{(8x^2 + 3)^2}$

C) $\frac{56x^3 - 112x^2 + 149x}{(8x^2 + 3)^2}$

D) $\frac{168x^2 - 128x + 21}{(8x^2 + 3)^2}$

15) _____

Suppose u and v are differentiable functions of x . Use the given values of the functions and their derivatives to find the value of the indicated derivative.

16) $u(2) = 6, u'(2) = 4, v(2) = -3, v'(2) = -5.$

$\frac{d}{dx}(uv)$ at $x = 2$

A) 39

B) -18

C) -42

D) 42

16) _____

Find dy/dx .

17) $y = \frac{\sqrt{x} - 8}{\sqrt{x} + 8}$

A) $\frac{16}{(x+8)\sqrt{x-64}}$

B) $-\frac{8}{\sqrt{x}(\sqrt{x}+8)^2}$

C) $\frac{8}{x+8}$

D) $\frac{8}{\sqrt{x}(\sqrt{x}+8)^2}$

17) _____

Solve the problem.

18) Assume that a watermelon dropped from a tall building falls $y = 16t^2$ ft in t sec. Find the watermelon's speed at the instant $t = 6$ sec.

A) 96 ft/sec

B) 192 ft/sec

C) 194 ft/sec

D) 97 ft/sec

18) _____

Determine the limit by substitution.

19) $\lim_{x \rightarrow 8} \frac{x^2 + 64}{x + 8}$

A) 16

B) 0

C) Does not exist

D) 8

19) _____

Determine the limit algebraically, if it exists.

20) $\lim_{x \rightarrow 7} \frac{x^2 + 2x - 63}{x - 7}$

A) Does not exist

B) 16

C) 2

D) 0

20) _____

21) $\lim_{x \rightarrow 0} \frac{\frac{1}{x+3} - \frac{1}{3}}{x}$

A) Does not exist

B) 0

C) $-\frac{1}{9}$

D) $\frac{1}{9}$

21) _____

Find the indicated limit.

22) $\lim_{x \rightarrow 0^+} \frac{7x}{|x|}$ 22) _____
A) 7 B) Does not exist C) 0 D) -7

Find the limit.

23) Let $\lim_{x \rightarrow 10} f(x) = 1$ and $\lim_{x \rightarrow 10} g(x) = 5$. Find $\lim_{x \rightarrow 10} [f(x) + g(x)]^2$. 23) _____
A) 26 B) 36 C) 6 D) -4

Find the limit, if it exists.

24) $\lim_{x \rightarrow -\infty} \frac{4x^3 + 3x^2}{x - 6x^2}$ 24) _____
A) ∞ B) $-\frac{1}{2}$ C) $-\infty$ D) 4

Use a finite approximation to estimate the area of the region enclosed between the graph of f and the x -axis for $a \leq x \leq b$.

25) $f(x) = x^2$, $a = 3$, $b = 7$ 25) _____
Use LRAM with four rectangles of equal width.
A) 105 B) 86 C) 117 D) 126

Graph the integrand and use areas to evaluate the integral.

26) $\int_{-10}^5 (-2x + 10) dx$ 26) _____
A) 225 B) 450 C) 75 D) 300

Express the desired quantity as a definite integral and evaluate the integral.

27) Find the distance of a train moving at 72 mph from 7:00 A.M. to 11:30 A.M. 27) _____
A) $\int_0^4 72 dt$, 288 miles B) $\int_7^{11} 72 dt$, 288 miles
C) $\int_0^{4.5} 72 dt$, 324 miles D) $\int_7^{11} 72 dt$, 785 miles

Solve the problem.

28) Suppose that $\int_3^4 f(x) dx = 7$. Find $\int_3^4 6f(u) du$ and $\int_3^4 -f(u) du$. 28) _____
A) 13; 7 B) 42; -7 C) $42; \frac{1}{7}$ D) 6; -7

USE NINT to find the average value of the function on the interval. At what point in the interval does the function assume its average value?

29) $y = -4x^2 - 1$, $[0, 3.87298335]$ 29) _____
A) -21, at $x = 2.23606798$ B) 21, at $x = 2.23606798$
C) 61, at $x = 3.87298335$ D) -61, at $x = 3.87298335$

Evaluate the definite integral.

30) $\int_{-\pi/2}^{\pi/2} (\cos x + 9) dx$

30) _____

A) 9π

B) 11

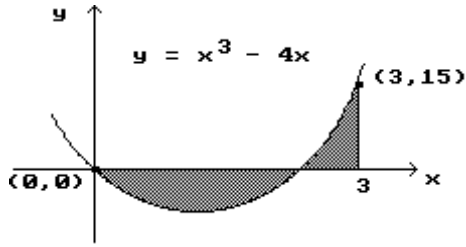
C) $2 + 9\pi$

D) 0

Find the area of the shaded region.

31)

31) _____



A) $\frac{41}{4}$

B) $\frac{9}{4}$

C) $\frac{17}{4}$

D) $\frac{33}{4}$

Use the Trapezoidal Rule to estimate the integral.

32) $\int_0^1 \frac{1}{1+x} dx, n = 4$

32) _____

A) $\frac{743}{840}$

B) $\frac{1171}{840}$

C) $\frac{1747}{5040}$

D) $\frac{1171}{1680}$

Find the points of discontinuity of the integrand on the interval of integration, and use area to evaluate the integral.

33) $\int_{-6}^1 \frac{x}{|x|} dx$

33) _____

A) 0, -5

B) 0, 7

C) $0, -\frac{1}{5}$

D) 0, -6