

MASTER COPY*DO NOT WRITE ON THIS*MASTER COPY*DO NOT WRITE ON THIS*MASTER COPY*DO NOT WRITE

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

Find the points of inflection.

- 1) $y = x\sqrt{13 - x^2}$ 1) _____
A) (0, 13) B) (0, 0)
C) No inflection points. D) (13, 0)

Determine the limit algebraically, if it exists.

- 2) $\lim_{x \rightarrow 0} \frac{\frac{1}{x+6} - \frac{1}{6}}{x}$ 2) _____
A) Does not exist B) $\frac{1}{36}$ C) $-\frac{1}{36}$ D) 0

- 3) $\lim_{x \rightarrow 1} \frac{x^2 + 7x - 8}{x - 1}$ 3) _____
A) 9 B) Does not exist C) 7 D) 0

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.

- 4)

x	f(x)	g(x)	f'(x)	g'(x)
3	1	16	6	3
4	-3	3	5	-4

 4) _____

- $\sqrt{f(x) + g(x)}$ at $x = 3$
A) $-\frac{1}{2\sqrt{17}}$ B) $\frac{1}{2\sqrt{17}}$ C) $\frac{9}{\sqrt{17}}$ D) $\frac{9}{2\sqrt{17}}$

Find dy/dx.

- 5) $y = \frac{9x - 8}{9x^2 + 1}$ 5) _____
A) $\frac{-81x^2 + 144x + 9}{(9x^2 + 1)^2}$ B) $\frac{243x^2 - 144x + 9}{(9x^2 + 1)^2}$
C) $\frac{-81x^2 + 135x + 17}{(9x^2 + 1)^2}$ D) $\frac{81x^3 - 162x^2 + 153x}{(9x^2 + 1)^2}$

- 6) $y = 5xe^x - 5e^x$ 6) _____
A) $5e^x$ B) $5x$ C) $5xe^x$ D) $5xe^x + 10e^x$

7) $y = \ln(\ln 7x)$

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

B) $\frac{1}{7x}$

C) $\frac{1}{x \ln 7x}$

D) $\frac{1}{\ln 7x}$

7) _____

8) $y = 4 \sec^2 x$

A) $8 \tan^2 x \sec^2 x$

B) $8 \tan x \sec^2 x$

C) $8 \tan^2 x \sec^1 x$

D) $8 \sec^1 x$

8) _____

Solve the problem.

9) At time t , the position of a body moving along the s -axis is $s = t^3 - 21t^2 + 120t$ m. Find the body's acceleration each time the velocity is zero.

9) _____

A) $a(10) = 18 \text{ m/sec}^2, a(4) = -18 \text{ m/sec}^2$

B) $a(10) = 0 \text{ m/sec}^2, a(4) = 0 \text{ m/sec}^2$

C) $a(20) = 120 \text{ m/sec}^2, a(8) = 20 \text{ m/sec}^2$

D) $a(10) = -18 \text{ m/sec}^2, a(4) = 18 \text{ m/sec}^2$

10) 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 $t = 5$ sec.

10) _____

A) 81 ft/sec

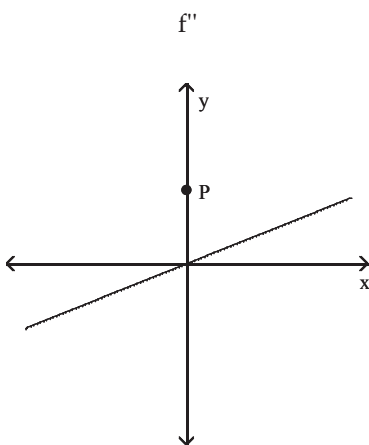
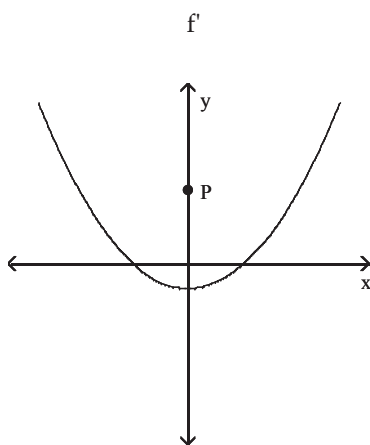
B) 162 ft/sec

C) 160 ft/sec

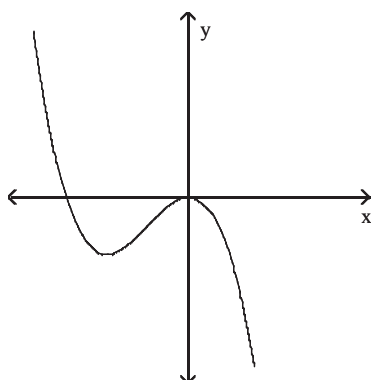
D) 80 ft/sec

11) The graphs below show the first and second derivatives of a function $y = f(x)$. Select a possible graph of f that passes through the point P.

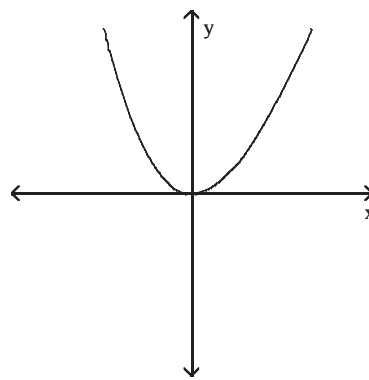
11) _____

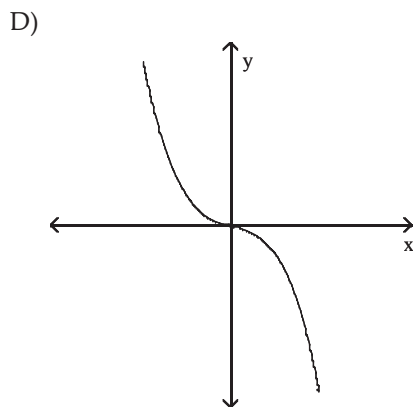
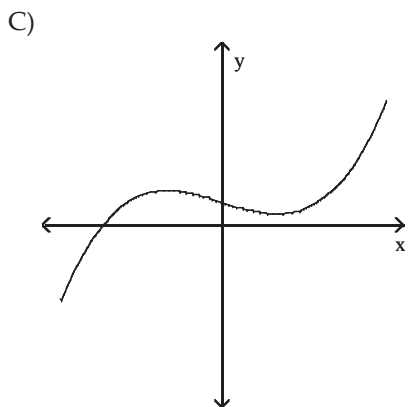


A)

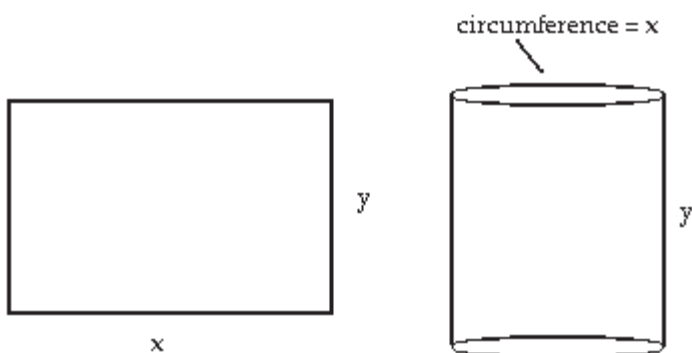


B)





12) A rectangular sheet of perimeter 30 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? 12) _____



- A) $x = 12$ cm; $y = 3$ cm
 B) $x = 9$ cm; $y = 6$ cm
 C) $x = 11$ cm; $y = 4$ cm
 D) $x = 10$ cm; $y = 5$ cm

Determine the limit

13) $\lim_{x \rightarrow 3} \frac{x^2 + 9}{x + 3}$ 13) _____
 A) 6 B) Does not exist C) 3 D) 0

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

14) $\cos xy + x^4 = y^4$ 14) _____
 A) $\frac{4x^3 + y \sin xy}{4y^3 - x \sin xy}$ B) $\frac{4x^3 + x \sin xy}{4y^3}$ C) $\frac{4x^3 - x \sin xy}{4y^3}$ D) $\frac{4x^3 - y \sin xy}{4y^3 + x \sin xy}$

Find the derivative of the given function.

15) $y = \tan^{-1} \sqrt{7x}$ 15) _____
 A) $\frac{1}{1 + 7x}$ B) $\frac{1}{\sqrt{1 - 7x}}$ C) $\frac{7}{2(1 + 7x)\sqrt{7x}}$ D) $\frac{1}{14\sqrt{7x}(1 + 7x)}$

Find the indicated limit.

16) $\lim_{x \rightarrow 0^+} \frac{6x}{|x|}$ 16) _____
A) -6 B) Does not exist C) 6 D) 0

Find the limit, if it exists.

17) $\lim_{x \rightarrow -\infty} \frac{2x^3 + 3x^2}{x - 6x^2}$ 17) _____
A) $-\frac{1}{2}$ B) ∞ C) 2 D) $-\infty$

Find the horizontal tangents of the curve.

18) $y = x^4 - 8x^2 + 5$ 18) _____
A) At $x = 0, 2, -2$ B) At $x = 0$ C) At $x = 2, -2,$ D) At $x = 0, 2$

Find dy/dx .

19) $y = 15^{-x}$ 19) _____
A) -15^{-x} B) $-\ln 15 (15^{-x})$ C) 15^{-x} D) $\ln 15 (15^{-x})$

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.

20) $u(2) = 9, u'(2) = 2, v(2) = -1, v'(2) = -4.$ 20) _____
 $\frac{d}{dx}(uv)$ at $x = 2$
A) -38 B) 22 C) -34 D) 38

Find the limit.

21) Let $\lim_{x \rightarrow -2} f(x) = -6$ and $\lim_{x \rightarrow -2} g(x) = -5$. Find $\lim_{x \rightarrow -2} [f(x) + g(x)]^2$. 21) _____
A) -11 B) 121 C) 61 D) -1

Give an appropriate answer.

22) Find the value or values of c that satisfy $\frac{f(b) - f(a)}{b - a} = f'(c)$ for the function $f(x) = x + \frac{150}{x}$ on the 22) _____
interval $[6, 25]$.
A) $5\sqrt{6}$ B) 6, 25 C) 0, $5\sqrt{6}$ D) $-5\sqrt{6}, 5\sqrt{6}$

Use the modified First or Second Derivative Test to determine any absolute extrema.

23) $y = xe^{5x}$ 23) _____
A) Absolute maximum at $\left(\frac{1}{5}, \frac{1}{5e}\right)$ B) Absolute minimum at $\left(\frac{1}{5}, \frac{e}{5}\right)$
C) Absolute minimum at $\left(-\frac{1}{5}, -\frac{1}{5e}\right)$ D) Absolute maximum at $\left(-\frac{1}{5}, -\frac{e}{5}\right)$