Find the absolute extreme values of the function on the interval.

1) $g(x) = 10 - 6x^2$, $-3 \le x \le 4$ 1) ________

A) absolute maximum is 60 at x = 0; absolute minimum is -44 at x = -3
B) absolute maximum is 6 at x = 0; absolute minimum is -106 at x = 4
C) absolute maximum is 20 at x = 0; absolute minimum is -44 at x = 4
D) absolute maximum is 10 at x = 0; absolute minimum is -86 at x = 4

Find the absolute extreme values of the function on the interval.

2) $f(x) = 2x^{8/3}$, $-27 \le x \le 8$ 2) ________

A) absolute maximum is 6561 at x = -27 ; absolute minimum is 0 at x = 0
B) absolute maximum is 512 at x = 8 ; absolute minimum is 0 at x = 0
C) absolute maximum is 13,122 at x = -27 ; absolute minimum is 0 at x = 0
D) absolute maximum is 13,122 at x = -27 ; absolute minimum is 512 at x = 8

Determine all critical points for the function.

3) $f(x) = x^3 - 6x^2 + 2$ 3) ________

A) x = 0 and x = 4 B) x = -2 and x = 2 C) x = 0 D) x = 0 and x = 2

4) $f(x) = \dfrac{5x}{x + 1}$ 4) ________

A) x = 0 and x = -1 B) x = 5 and x = 0 C) x = -1 D) x = 1

Find the extreme values of the function and where they occur.

5) $y = x^3 - 12x + 2$ 5) ________

A) Local maximum at (0, 0).
B) None
C) Local maximum at (2, -14), local minimum at (-2, 18).
D) Local maximum at (-2, 18), local minimum at (2, -14).

6) $y = (x + 3)^{2/3}$ 6) ________

A) The maximum value is 0 at x = 3. B) There are no definable extrema.
C) The minimum value is 0 at x = 3. D) The minimum value is 0 at x = -3.

7) $y = x^2e^x$ 7) ________

A) Minimum value is 0 at x = 0, maximum value is 0.5413.. at x = -2.
B) Minimum value is $4e^{-2}$ at x = -2; no maximum value.
C) Minimum value is 0 at x = 0; no maximum value.
D) None

Find the value or values of c that satisfy the equation $\dfrac{f(b) - f(a)}{b - a} = f'(c)$ in the conclusion of the Mean Value Theorem for the function and interval.

8) $f(x) = x^2 + 2x + 2$, [-2, -1] 8) ________

A) $-\frac{3}{2}, \frac{3}{2}$ B) $-\frac{3}{2}$ C) $0, -\frac{3}{2}$ D) -2, -1

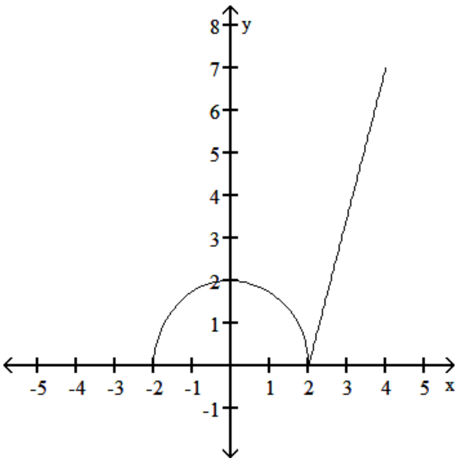
Using the derivative of f(x) given below, determine the intervals on which f(x) is increasing or decreasing.

9) $f'(x) = (x - 8) e^{-x}$ 9) _______

A) Decreasing on $(-\infty, 8)$; increasing on $(8, \infty)$
B) Increasing on $(-\infty, 8)$; decreasing on $(8, \infty)$
C) Increasing on $(-\infty, -8)$; decreasing on $(-8, \infty)$
D) Decreasing on $(-\infty, -8)$; increasing on $(-8, \infty)$

Find the open intervals on which the function is increasing and decreasing. Identify the function's local and absolute extreme values, if any, saying where they occur.

10) 10) _______



A) increasing on (-2, 0) and (2, 4); decreasing on (0, 2);
absolute maximum at (4, 7); absolute minimum at (-2, 0) and (2, 0)
B) increasing on (-2, 0) and (2, 4); decreasing on (0, 2);
absolute maximum at (4, 7); local maximum at (0, 2); absolute minimum at (-2, 0) and (2, 0)
C) increasing on (-2, 0) and (2, 4); decreasing on (0, 2);
absolute maximum at (4, 7) and(0,2); absolute minimum at (-2, 0) and (2, 0)
D) increasing on (2, 4); decreasing on (0, 2);
absolute maximum at (4, 7); local maximum at (0, 2); absolute minimum at (-2, 0) and (2, 0)

Find the largest open interval where the function is changing as requested.

11) Increasing $f(x) = \frac{1}{x^2 + 1}$ 11) _______

A) $(1, \infty)$ B) $(-\infty, 0)$ C) $(0, \infty)$ D) $(-\infty, 1)$

12) Decreasing $f(x) = \sqrt{4 - x}$ 12) _______

A) $(-\infty, -4)$ B) $(4, \infty)$ C) $(-4, \infty)$ D) $(-\infty, 4)$

13) Decreasing $y = \frac{1}{x^2} + 7$ 13) _______

A) (-7, 0) B) $(0, \infty)$ C) (-7, 7) D) $(7, \infty)$

Identify the function's local and absolute extreme values, if any, saying where they occur.

14) $g(x) = \frac{x^4}{4} + \frac{1}{3}x^3 - 8x^2 - 16x + 4$ 14) ______

A) local maxima at x = -4 and x = 4; local minimum at x = -1
B) local maximum at x = -4; local minimum at x = 4
C) local maximum at x = -1; local minima at x = -4 and x = 4
D) local maxima at x = 4 and x = -4; local minimum at x = -1

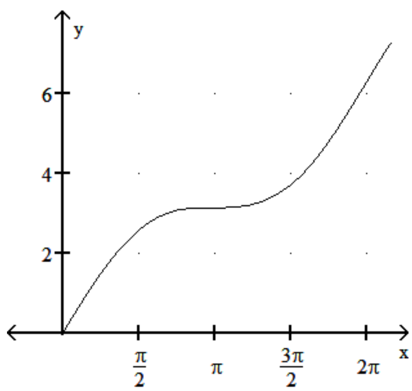
15) $f(x) = x^3 + 4x^2 - 3x + 4$ 15) ______

A) local maximum at x = -3; local minimum at $x = \frac{1}{3}$
B) local maximum at x = -1; local minimum at x = 1
C) local maximum at $x = \frac{-1}{3}$; local minimum at x = 3
D) local maximum at x = - 1; local minimum at x = 1

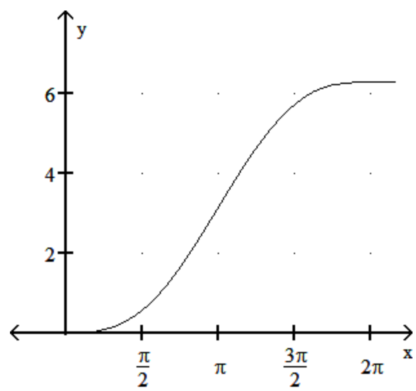
Sketch the graph and show all local extrema and inflection points.

16) $y = x - \sin x,\ 0 \le x \le 2\pi$ 16) ______

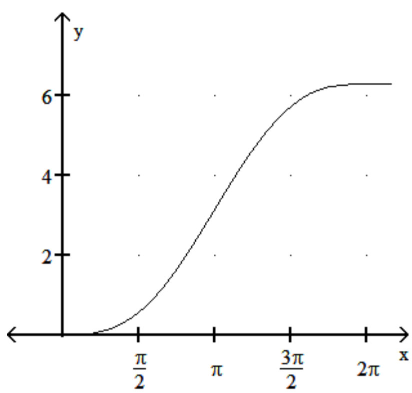
A) Local minimum: (0, 0)
Local maximum: $(2\pi, 2\pi)$
No inflection points



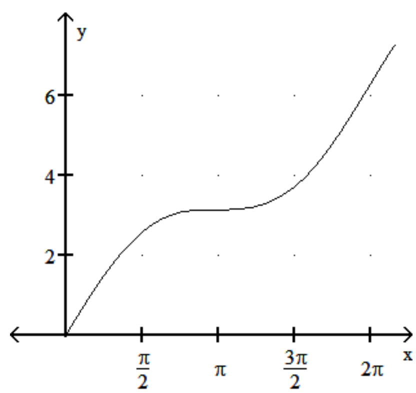
B) Local minimum: (0, 0)
Local maximum: $(2\pi, 2\pi)$
Inflection point: (π, π)



C) Local minimum: (0, 0)
Local maximum: $(2\pi, 2\pi)$
No inflection points



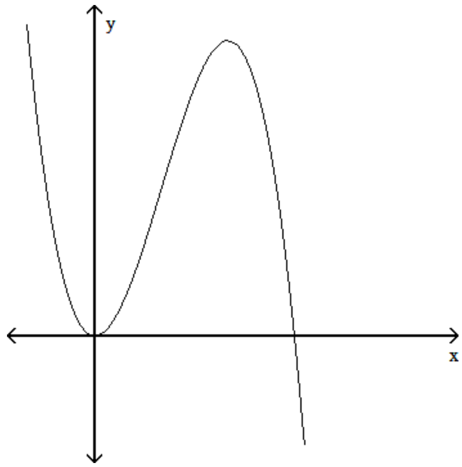
D) Local minimum: (0, 0)
Local maximum: $(2\pi, 2\pi)$
Inflection point: (π, π)



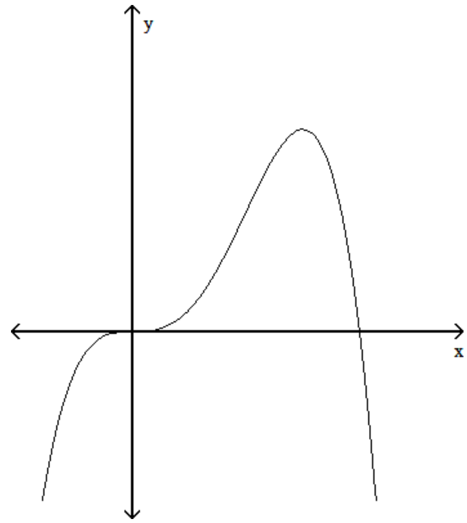
For the given expression y′, find y'' and sketch the general shape of the graph of y = f(x).

17) $y' = x^2(6 - x)$ 17) _______

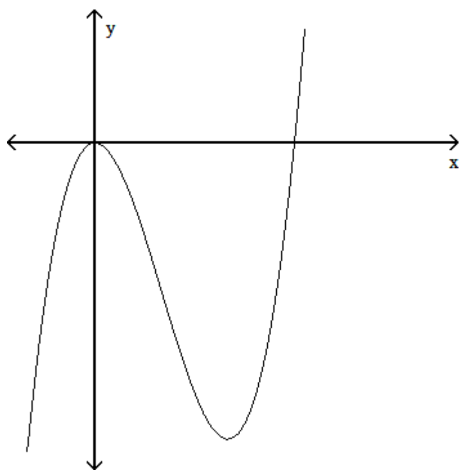
A)



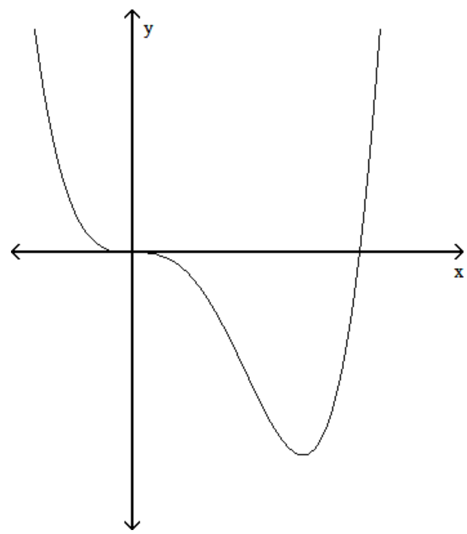
B)



C)

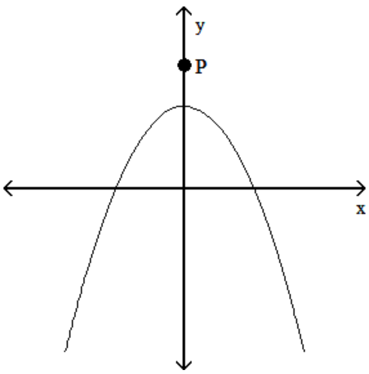


D)

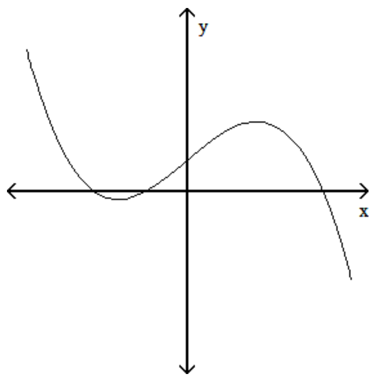


18) The graph below shows the first derivative of a function $y = f(x)$. Select a possible graph f that passes through the point P. 18) ______

f′

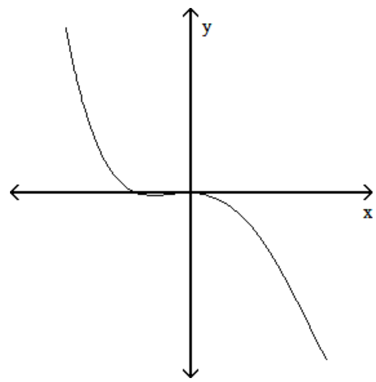


A)



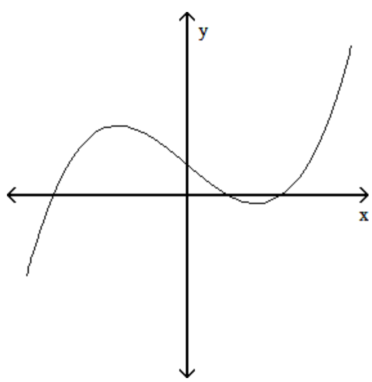
[NOTE: Graph vertical scales may vary from graph to graph.]

B)



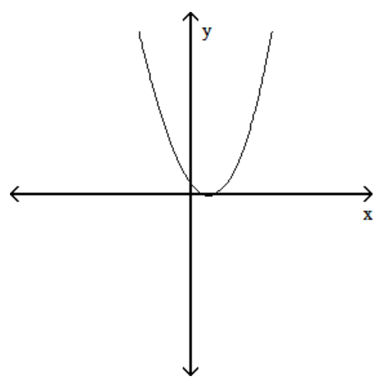
[NOTE: Graph vertical scales may vary from graph to graph.]

C)



[NOTE: Graph vertical scales may vary from graph to graph.]

D)



[NOTE: Graph vertical scales may vary from graph to graph.]

Find an antiderivative of the given function.

19) $x^{-4} + \frac{1}{9\sqrt{x}}$ 19) ______

A) $-\frac{1}{4x^4} + \frac{2}{9}x^{1/2}$ B) $-\frac{1}{3x^4} + \frac{2}{9}x^{1/2}$ C) $-\frac{1}{4x^3} + \frac{2}{9}x^{1/2}$ D) $-\frac{1}{3x^3} + \frac{2}{9}x^{1/2}$

20) $6 \cos 2x$ 20) ______

A) $\sin 2x$ B) $-12 \sin 2x$ C) $3 \sin 2x$ D) $6 \sin 2x$

21) $e^{-8x/9}$ 21) ______

A) $-\frac{9}{8}e^{-8x/9}$ B) $-\frac{8}{9}e^{-8x/9}$ C) $e^{-8x/9}$ D) $\frac{9}{8}e^{-8x/9}$

Find the most general antiderivative.

22) $\int (3x^3 + 6x + 4)\,dx$ 22) ______

A) $3x^4 + 6x^2 + 4x + C$

B) $9x^4 + 12x^2 + 4x + C$

C) $9x^2 + 6 + C$

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

23) $\int \left(\frac{\sqrt{y}}{5} + \frac{4}{\sqrt{y}}\right) dy$ 23) ______

A) $\frac{2}{15}y^{3/2} + 8\sqrt{y} + C$

B) $\frac{1}{10}\sqrt{y} - \frac{1}{8\sqrt{y}} + C$

C) $\frac{2}{15}y^{3/2} - 8\sqrt{y} + C$

D) $\frac{3}{10}y^{3/2} + \frac{1}{8}\sqrt{y} + C$

24) $\int (-3 \sec^2 x)\,dx$ 24) ______

A) $-3 \cot x + C$ B) $3 \cot x + C$ C) $\frac{\tan x}{3} + C$ D) $-3 \tan x + C$

25) $\int (7e^{4x} - 4e^{-x})\,dx$ 25) ______

A) $\frac{4}{7}e^{4x} + 4e^{-x} + C$

B) $\frac{7}{4}e^{4x} + 4e^{-x} + C$

C) $\frac{7}{4}e^{4x} - 4e^{-x} + C$

D) $\frac{7}{4}e^{4x} + \frac{1}{4}e^{-x} + C$

26) $\int \left(\frac{9}{\sqrt{1 - x^2}} - \frac{2}{x}\right) dx$ 26) ______

A) $\frac{\sin^{-1} x}{9} - \frac{\ln |x|}{2} + C$

B) $9 \sin^{-1} x + 2 \ln |x| + C$

C) $9 \sin^{-1} x - \ln |x| + C$

D) $9 \sin^{-1} x - 2 \ln |x| + C$

27) $\int \left(\frac{2}{x^2 + 1} - \frac{7}{x}\right) dx$ 27) ______

A) $2 \tan^{-1} x + 7 \ln |x| + C$

B) $\frac{\tan^{-1} x}{2} - \frac{\ln |x|}{7} + C$

C) $2 \tan^{-1} x - 7 \ln |x| + C$

D) $2 \tan^{-1} x - \ln |x| + C$

Use differentiation to determine whether the integral formula is correct.

28) $\int (2x - 3)^4 \, dx = \frac{(2x - 3)^5}{10} + C$ 28) ______

A) No

B) Yes

29) $\int x \sin x \, dx = -x \cos x + \sin x + C$ 29) ______

A) No

B) Yes

30) $\int x \cos x \, dx = \frac{x^2}{2} \sin x + C$ 30) ______

A) Yes

B) No

Solve the initial value problem.

31) $\frac{dy}{dx} = \frac{1}{x + 8}$, $y(-7) = 3$ 31) ______

A) $y = -\frac{1}{(x + 8)^2} + 3$

B) $y = -\frac{1}{(x + 8)^2} + 4$

C) $y = \ln(x + 8) + 3 - \ln 2$

D) $y = \ln(x + 8) + 3$

32) $\frac{dy}{dx} = \frac{1}{x^3} + x, \; x > 0; \; y(2) = 5$ 32) ______

A) $y = \frac{4}{x^4} + \frac{x^2}{2} + \frac{11}{4}$

B) $y = -\frac{1}{2x^2} + \frac{x^2}{2} + \frac{25}{8}$

C) $y = \frac{-1}{2x^2} + \frac{x^2}{2}$

D) $y = -\frac{1}{2x^2} + \frac{41}{8}$

Answer Key
Testname: REVIEW03

1) D
2) C
3) A
4) C
5) D
6) D
7) A
8) B
9) A
10) B
11) B
12) D
13) B
14) C
15) A
16) B
17) B
18) A
19) D
20) C
21) A
22) D
23) A
24) D
25) B
26) D
27) C
28) B
29) B
30) B
31) D
32) B