Calculus Semester Exam Review Name____________________________

Fall 2007 Gover12/07

Date:_________________Per:______

Show your work on this or a separate sheet.

Solve the problem.

1) Assume that a watermelon dropped from a tall building falls $y = 16t^2$ ft in t sec. Find the watermelon's average speed during the first 6 sec of fall. 1) ________

A) 48 ft/sec B) 97 ft/sec C) 192 ft/sec D) 96 ft/sec

Determine the limit by substitution.

2) $\lim\limits_{x \to 8} \dfrac{x^2 + 64}{x + 8}$ 2) ________

A) Does not exist B) 8 C) 16 D) 0

Determine the limit algebraically, if it exists.

3) $\lim\limits_{x \to 2} \sqrt{x - 3}$ 3) ________

A) 0 B) Does not exist C) 1 D) −1

4) $\lim\limits_{x \to 0} \dfrac{\dfrac{1}{x + 3} - \dfrac{1}{3}}{x}$ 4) ________

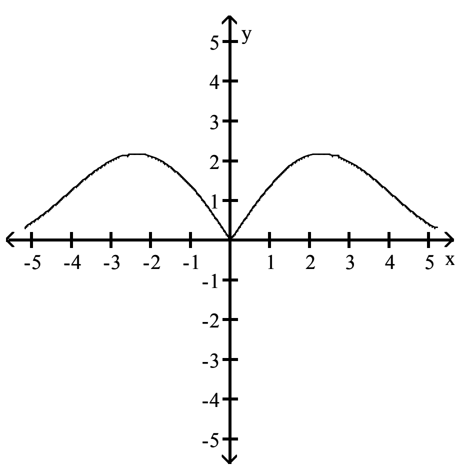
A) Does not exist B) $\dfrac{1}{9}$ C) $-\dfrac{1}{9}$ D) 0

5) $\lim\limits_{x \to 0} \dfrac{6 \sin x}{7x}$ 5) ________

A) Does not exist B) 1 C) $\dfrac{6}{7}$ D) 0

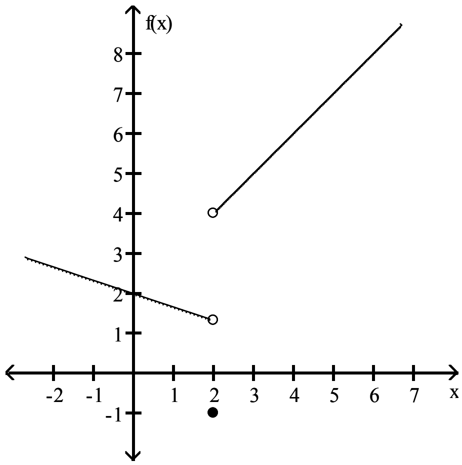
Determine the limit graphically, if it exists.

6) $\lim\limits_{x \to 0} f(x)$ 6) ________



A) Does not exist B) 0 C) −3 D) 3

7) $\lim_{x \to 2^+} f(x)$ 7) ________



A) −1 B) 1.3 C) 5 D) 4

Find the indicated limit.

8) $\lim_{x \to 0^+} \frac{7x}{|x|}$ 8) ________

A) 0 B) 7 C) −7 D) Does not exist

Find the limit.

9) Let $\lim_{x \to 4} f(x) = 7$ and $\lim_{x \to 4} g(x) = -1$. Find $\lim_{x \to 4} [f(x) \cdot g(x)]$. 9) ________

A) −7 B) 4 C) −1 D) 6

Find the limit, if it exists.

10) $\lim_{x \to \infty} \frac{x^2 - 4x + 17}{x^3 + 9x^2 + 8}$ 10) ________

A) $\frac{17}{8}$ B) 0 C) ∞ D) 1

11) $\lim_{x \to -\infty} \frac{4x^3 + 3x^2}{x - 6x^2}$ 11) ________

A) $-\frac{1}{2}$ B) 4 C) $-\infty$ D) ∞

Find the intervals on which the function is continuous.

12) $y = \frac{2}{(x + 4)^2 + 8}$ 12) ________

A) $(-\infty, 24), (24, \infty)$ B) $(-\infty, -32), (-32, \infty)$

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

13) $y = \sqrt{5x + 9}$ 13) _______

A) $\left(-\frac{9}{5}, \infty\right)$ B) $\left[\frac{9}{5}, \infty\right)$ C) $\left(-\infty, -\frac{9}{5}\right]$ D) $\left[-\frac{9}{5}, \infty\right)$

Find the points of discontinuity. Identify each type of discontinuity.

14) $y = \dfrac{3}{(x + 5)^2 + 10}$ 14) _______

A) $x = -5$, jump discontinuity B) $x = -5$, infinite discontinuity

C) $x = 35$ D) None

Find a value for a so that the function f(x) is continuous.

15) $f(x) = \begin{cases} x^2 - 5, & x < 4 \\ 5ax, & x \geq 4 \end{cases}$ 15) _______

A) $a = \frac{11}{20}$ B) $a = \frac{4}{5}$ C) $a = 9$ D) $a = 11$

Use the definition $f'(a) = \lim\limits_{h \to 0} \dfrac{f(a + h) - f(a)}{h}$ to find the derivative of the given function at the indicated point.

16) $f(x) = 19 - 20x$, $a = 1$ 16) _______

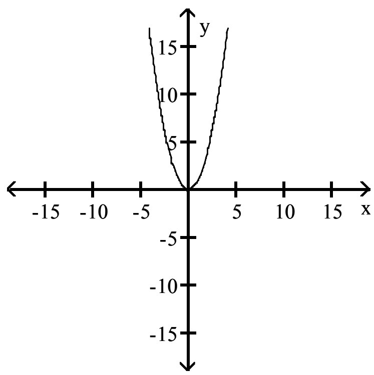
A) 19 B) −19 C) −1 D) − 20

17) $f(x) = x^3 + 6$, $a = 2$ 17) _______

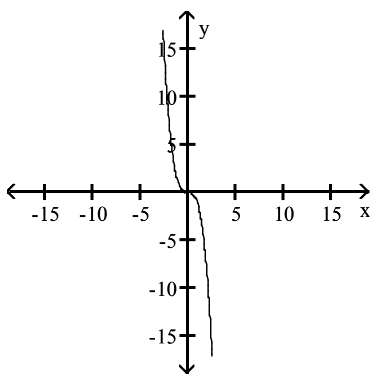
A) −12 B) 13 C) 18 D) 12

The graph of a function is given. Choose the answer that represents the graph of its derivative.

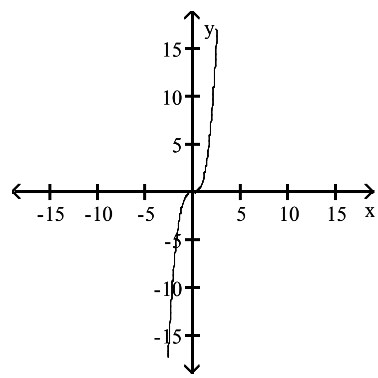
18) 18) ________



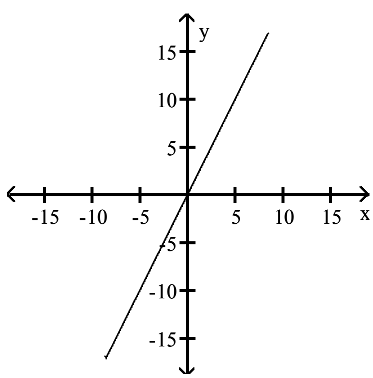
A)



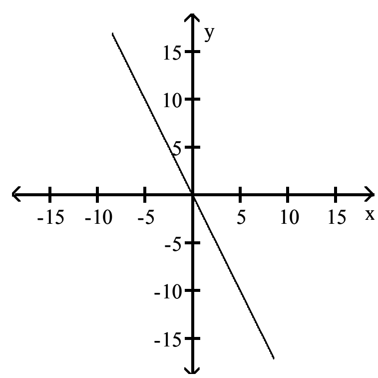
B)



C)



D)



Solve the problem.

19) If $y = x^2 - 2$, find an equation of the tangent line to the graph of y at x = 3. 19) ________

A) $y = 3x - 11$ B) $y = 6x - 22$ C) $y = 6x - 11$ D) $y = 6x - 20$

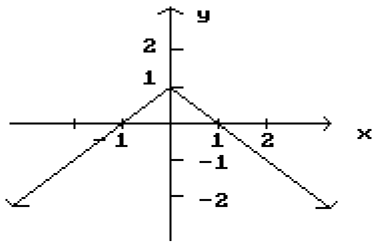
20) Find the equation of the normal line to the curve $y = 3x - 5x^2$ at the point (−3, −54). 20) ________

A) $x - 27y + 1785 = 0$ B) $x + 33y + 1785 = 0$

C) $x - 27y + 975 = 0$ D) $x + 33y + 975 = 0$

Find the values where the function is not differentiable.

21) 21) ________



A) $x = 2$ B) $x = 1$ C) $x = 0$ D) $x = -1$

Find dy/dx.

22) $y = (1 - 5x^2)(9x^2 - 180)$ 22) ________

A) $45x^3 + 909x$ B) $-180x^4 + 1818x^2$

C) $-180x^3 + 1818x$ D) $-180x^3 + 1818$

23) $y = \dfrac{x}{2x - 2}$ 23) ________

A) $-\dfrac{2x}{(2x - 2)^2}$ B) $-\dfrac{2}{(2x - 2)^2}$ C) $\dfrac{4x - 2}{(2x - 2)^2}$ D) $-\dfrac{2}{2x - 2}$

Find the slope of the line tangent to the curve at the given value of x.

24) $y = 5 - 3x^2$; $x = 2$ 24) ________

A) 17 B) 12 C) -7 D) -12

Find dy/dx.

25) $y = \dfrac{\sqrt{x} - 8}{\sqrt{x} + 8}$ 25) ________

A) $\dfrac{8}{x + 8}$ B) $\dfrac{16}{(x + 8)\sqrt{x - 64}}$ C) $\dfrac{8}{\sqrt{x}(\sqrt{x} + 8)^2}$ D) $-\dfrac{8}{\sqrt{x}(\sqrt{x} + 8)^2}$

Find the fourth derivative of the function.

26) $y = 5x^5 - 6x^2 - 5x + 1$ 26) ________

A) $400x + 12$ B) $300x$ C) $400x^2 + 12$ D) $600x$

Solve the problem.

27) The function $V = 4\pi r^2$ describes the volume of a right circular cylinder of height 4 feet and radius r feet. Find the (instantaneous)rate of change of the volume with respect to the radius when $r = 8$. Leave answer in terms of π. 27) ________

A) 32π ft^3/ft B) 16π ft^3/ft C) 8π ft^3/ft D) 64π ft^3/ft

28) The dollar profit from the expenditure of x thousand dollars on advertising is given by $P(x) = 780 + 35x - 2x^2$. Find the marginal profit when the expenditure is $x = 14$. 28) ________

A) 780 thousand dollars
B) 490 thousand dollars
C) −21 thousand dollars
D) 434 thousand dollars

29) Given the distance function $s(t) = t^2 + 9t + 10$, where s is in feet and t is in seconds, find the velocity function, v(t), and the acceleration function, a(t). 29) ________

A) $v(t) = 2t + 9$; $a(t) = 0$
B) $v(t) = 2t + 19$; $a(t) = 2$
C) $v(t) = 2t + 9$; $a(t) = 2t$
D) $v(t) = 2t + 9$; $a(t) = 2$

30) A ball dropped from the top of a building has a height of $s = 256 - 16t^2$ meters after t seconds. How long does it take the ball to reach the ground? 30) ________

A) 64 sec
B) 4 sec
C) 16 sec
D) 8 sec

Find dy/dx.

31) $y = 6 \tan^2 x$ 31) ________

A) $12 \tan^2 x \sec x$
B) $12 \tan^1 x \sec^2 x$
C) $12 \tan^3 x$
D) $12 \tan^1 x$

32) $y = 3 \sec^4 x$ 32) ________

A) $12 \tan^2 x \sec^4 x$
B) $12 \tan^2 x \sec^3 x$
C) $12 \tan x \sec^4 x$
D) $12 \sec^3 x$

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

33) $s = -2 + 5 \cos t$ 33) ________

Find the body's velocity at time $t = \pi/3$ sec.

A) $\frac{5\sqrt{3}}{2}$ m/sec
B) $-\frac{5\sqrt{3}}{2}$ m/sec
C) $\frac{5}{2}$ m/sec
D) $-\frac{5}{2}$ m/sec

Find the indicated derivative.

34) Find y'' if $y = 6 \sin x$. 34) ________

A) $y'' = 6 \sin x$
B) $y'' = -6 \sin x$
C) $y'' = 36 \sin x$
D) $y'' = 6 \cos x$

Solve the problem.

35) The position of a particle moving along a coordinate line is $s = \sqrt{3 + 6t}$, with s in meters and t in seconds. Find the particle's velocity at $t = 1$ sec. 35) ________

A) $\frac{1}{6}$ m/sec
B) 1 m/sec
C) 2 m/sec
D) $-\frac{1}{3}$ m/sec

Find y ″.

36) $y = 6 \sin(2x + 10)$ 36) _______

A) $-24 \cos(2x + 10)$

B) $-24 \sin(2x + 10)$

C) $-12 \sin(2x + 10)$

D) $12 \cos(2x + 10)$

Solve the problem.

37) 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. 37) _______

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

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

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

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

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

38) $2x + 4y = -1$ 38) _______

A) -2

B) 4

C) $-\frac{1}{2}$

D) $-\frac{1}{2}x$

Find the derivative of the given function.

39) $y = 3 \sin^{-1}(5x^4)$ 39) _______

A) $\dfrac{60x^3}{1 - 25x^8}$

B) $\dfrac{60x^3}{\sqrt{1 - 25x^8}}$

C) $\dfrac{3}{\sqrt{1 - 25x^8}}$

D) $\dfrac{60x^3}{\sqrt{1 - 25x^4}}$

Find dy/dx.

40) $f(x) = e^{6x}$ 40) _______

A) $\frac{1}{6}e^{6x}$

B) $6e^{6x}$

C) $6e^x$

D) e^{6x}

41) $y = 7xe^x - 7e^x$ 41) _______

A) $7xe^x + 14e^x$

B) $7x$

C) $7xe^x$

D) $7e^x$

42) $y = 6^{\cos x}$ 42) _______

A) $6^{\cos x}$

B) $-6^{\cos x} \ln 6 \sin x$

C) $6^{\cos x} \ln 6 \sin x$

D) $6^{\cos x} \ln 6$

43) $y = \ln 6x$ 43) _______

A) $-\frac{1}{6x}$

B) $\frac{1}{6x}$

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

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

44) $y = \ln(\ln 5x)$ 44) _______

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

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

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

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

Use logarithmic differentiation to find dy/dx.

45) $y = 5^{8x}$ 45) ________

A) $8 (\ln 5) 5^{8x}$ B) $40 (\ln 8) 5^{8x}$ C) $40 (\ln 5) 5^{8x}$ D) $5 (\ln 8) 5^{8x}$

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

46) $g(x) = -x^2 + 11x - 30$ on $5 \le x \le 6$ 46) ________

A) Maximum value is $\frac{5}{4}$ at $x = \frac{13}{2}$; minimum value is 0 at $x = 6$ and 0 at $x = 5$

B) Maximum value is $\frac{1}{4}$ at $x = \frac{13}{2}$; minimum value is 0 at $x = 6$ and 0 at $x = 5$

C) Maximum value is $\frac{241}{4}$ at $x = \frac{11}{2}$; minimum value is 0 at $x = 6$ and 0 at $x = 5$

D) Maximum value is $\frac{1}{4}$ at $x = \frac{11}{2}$; minimum value is 0 at $x = 6$ and 0 at $x = 5$

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

47) $f(x) = -3x^4 + 20x^3 - 36x^2 + 9$ 47) ________

A) The maximum is 0 at $x = 0$. B) The maximum is 9 at $x = 0$.

C) The minimum is 9 at $x = 0$. D) There are none.

48) $y = \dfrac{x + 1}{x^2 + 2x + 2}$ 48) ________

A) The maximum is $\frac{1}{2}$ at $x = 0$; the minimum is $-\frac{1}{2}$ at $x = -2$.

B) The maximum is $-\frac{1}{2}$ at $x = 0$; the minimum is $\frac{1}{2}$ at $x = -2$.

C) The maximum is 2 at $x = 0$; the minimum is $\frac{1}{2}$ at $x = -2$.

D) There are none.

Determine whether the function satisfies the hypotheses of the Mean Value Theorem on the given interval.

49) $g(x) = x^{3/4}$ on [0, 3] 49) _______

A) Yes B) No

Give an appropriate answer.

50) Find the value or values of c that satisfy $\frac{f(b) - f(a)}{b - a} = f'(c)$ for the function $f(x) = x^2 + 3x + 3$ on the interval [−2, 1]. 50) _______

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

Use analytic methods to find the local extrema.

51) $f(x) = x^2 - 18x + 89$ 51) _______

A) Local maximum at (8, 0) B) Local maximum at (9, 8)

C) Local minimum at (8, 9) D) Local minimum at (9, 8)

Use analytic methods to find those values of x for which the given function is increasing and those values of x for which it is decreasing.

52) $f(x) = 27x - x^3$ 52) _______

A) Increasing on (−∞, 3), decreasing on (3, ∞)

B) Increasing on (−∞, −3), decreasing on (−3, 3)

C) Increasing on (−9, 9), decreasing on (−∞, −9) and (9, ∞)

D) Increasing on (−3, 3), decreasing on (−∞, −3) and (3, ∞)

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

53) $y = xe^{2x}$ 53) _______

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

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

Use the Concavity Test to find the intervals where the graph of the function is concave up.

54) $y = -3x^2 + 18x + 5$ 54) _______

A) (3, ∞) B) (−∞, 3) C) (−∞, ∞) D) None

Find the points of inflection.

55) $y = x^3 + 10x + 2$ 55) ________

A) (2, 10) B) (0, 10) C) (0, 2) D) (2, 0)

Use the Second Derivative Test to find the local extrema for the function.

56) $y = x^2 + 3x - 5$ 56) ________

A) Local minimum: $\left(-\frac{3}{2}, -\frac{29}{4}\right)$

B) Local minimum: $\left(\frac{3}{2}, \frac{11}{4}\right)$

C) Local maximum: $\left(\frac{3}{2}, \frac{29}{4}\right)$

D) Local maximum: $\left(-\frac{3}{2}, -\frac{29}{4}\right)$

Solve the problem.

57) A carpenter is building a rectangular room with a fixed perimeter of 120 ft. What are the dimensions of the largest room that can be built? What is its area? 57) ________

A) 60 ft × 60 ft; 3600 ft^2

B) 30 ft × 90 ft; 2700 ft^2

C) 30 ft × 30 ft; 900 ft^2

D) 12 ft × 108ft; 1296 ft^2

58) If the price charged for a candy bar is p(x) cents, then x thousand candy bars will be sold in a certain city, where $p(x) = 99 - \frac{x}{16}$. How many candy bars must be sold to maximize revenue? 58) ________

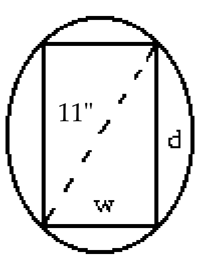
A) 1584 thousand candy bars

B) 792 candy bars

C) 1584 candy bars

D) 792 thousand candy bars

59) The strength S of a rectangular wooden beam is proportional to its width times the square of its depth. Find the dimensions of the strongest beam that can be cut from a 11-in.-diameter cylindrical log. (Round answers to the nearest tenth.) 59) ________



A) w = 7.4; d = 8.0

B) w = 5.4; d = 10.0

C) w = 6.4; d = 9.0

D) w = 7.4; d = 10.0

60) The diameter of a tree was 12 in. During the following year, the circumference increased 2 in. About how much did the tree's diameter increase? 60) ________

A) $\frac{14}{\pi}$ in. B) $\frac{\pi}{2}$ in. C) $\frac{2}{\pi}$ in. D) $\frac{12}{\pi}$ in.

61) The radius of a right circular cylinder is increasing at the rate of 5 in./s, while the height is decreasing at the rate of 8 in./s. At what rate is the volume of the cylinder changing when the radius is 15 in. and the height is 20 in.? 61) ________

A) 1200π in.^{3}/s B) -300 in.^{3}/s C) -300π in.^{3}/s D) -80 in.^{3}/s

62) One airplane is approaching an airport from the north at 181 km/hr. A second airplane approaches from the east at 191 km/hr. Find the rate at which the distance between the planes changes when the southbound plane is 34 km away from the airport and the westbound plane is 21 km from the airport. 62) ________

A) 380 km/hr B) 1321 km/hr C) 110 km/hr D) 1524 km/hr

End of Review for Calculus AB Students

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

63) $f(x) = x^2$, $a = 3$, $b = 7$ 63) ________

Use LRAM with four rectangles of equal width.

A) 126 B) 117 C) 86 D) 105

64) $f(x) = x^2$, $a = 1$, $b = 5$ 64) ________

Use MRAM with four rectangles of equal width.

A) 41 B) 54 C) 30 D) 69

Estimate the volume.

65) The nose "cone" of a rocket is a paraboloid obtained by revolving the curve $y = \sqrt{x}$, $0 \le x \le 6$ about the x–axis, where x is measured in feet. Estimate the volume of the nose cone by partitioning [0, 6] into 6 subintervals of equal length, slicing the cone with planes perpendicular to the x–axis at the subintervals' midpoints, constructing cylinders of height 1 based on cross sections at these points, and finding the volumes of these cylinders. 65) ________

A) 56.5487 B) 48.1239 C) 57.5487 D) 47.1239

Estimate the value of the quantity.

66) The table shows the velocity of a remote controlled race car moving along a dirt path for 8 seconds. Estimate the distance traveled by the car using 8 subintervals of length 1 with left–end point values. 66) ________

Time (sec)	Velocity (in./sec)
0	0
1	10
2	20
3	16
4	26
5	29
6	31
7	12
8	5

A) 149 in. B) 134 in. C) 288 in. D) 144 in.

Express the limit as a definite integral.

67) $\lim_{n\to\infty} \sum_{k=1}^{n} c_k^6 \triangle x_k$, [−4, 1]   67) _______

A) $\int_{-4}^{1} 6x^5\, dx$ B) $\int_{-4}^{1} x^6\, dx$ C) $\int_{1}^{-4} x^6\, dx$ D) $\int_{1}^{n} x\, dx$

Graph the integrand and use areas to evaluate the integral.

68) $\int_{-1}^{5} 4\, dx$ 68) _______

A) 12   B) 16   C) 24   D) 6

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

69) A snail travels at 0.4 feet/min for 6 minutes. How far does it travel?   69) _______

A) $\int_{0}^{6} 0.4\, dt$; 2.4 ft   B) $\int_{0}^{1} 6\, dt$; 6 ft

C) $\int_{0}^{6} 0.4\, dt$; $\frac{0.4}{6}$ ft   D) $\int_{0}^{1} 0.4\, dt$; 0.4 ft

70) Find the output of a pump that produces 18 gallons per minute during the first 5 hours of its operation.   70) _______

A) $\int_{0}^{5} 18\, dt$, 90 gal   B) $\int_{0}^{300} 18\, dt$, 90 gal

C) $\int_{0}^{300} 18\, dt$, 5400 gal   D) $\int_{0}^{18} 300\, dt$, 5400 gal

Use NINT on a calculator to find the numerical integral of the function over the specified interval.

71) $y = 2\tan x$; from $x = 0$ to $x = \frac{\pi}{4}$ 71) _______

A) −1.3068541   B) 1.69314585   C) 0.69314585   D) −0.6931459

Solve the problem.

72) Suppose that $\int_{4}^{6} f(x)\, dx = -4$. Find $\int_{4}^{4} f(x)\, dx$ and $\int_{6}^{4} f(x)\, dx$.   72) _______

A) 0; 4   B) −4; 4   C) 4; −4   D) 0; −4

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?

73) $y = \frac{-x^2}{3}$, [0, 4.24264069] 73) ________

A) −2, at x = 2.44948974

B) 6, at x = 4.24264069

C) 2, at x = 2.44948974

D) −6, at x = 4.24264069

Evaluate the definite integral.

74) $\int_{-4}^{6} e^x \, dx$ 74) ________

A) $e^6 - \frac{1}{e^4}$

B) $e^6 + e^4$

C) e^{10}

D) $e^6 - e^4$

Solve the problem.

75) Find f'(x) if f(x) = 5x − 5. 75) ________

A) f'(x) = 0

B) f'(x) = 5

C) f'(x) = 5x

D) f'(x) = −5

Evaluate the definite integral.

76) $\int_{1}^{3} (2x^3 - 8x^{-2}) \, dx$ 76) ________

A) 56

B) 51.17

C) 72

D) 34.67

77) $\int_{0}^{\pi} 9 \sin x \, dx$ 77) ________

A) 2

B) 9

C) 18

D) 162

Find the average value over the given interval.

78) $y = 3x^5$; [−3, 3] 78) ________

A) 0

B) 729

C) $\frac{243}{4}$

D) $\frac{243}{2}$

Find dy/dx.

79) $\int_{1}^{\sqrt{x}} 12t^5 \, dt$ 79) ________

A) $12x^{5/2}$

B) $2x^4 - 2$

C) $6x^2$

D) $8x^4$

80) $\int_{0}^{\sin t} \frac{1}{9 - x^2}\, dx$ 80) _______

A) $\frac{1}{9 - \sin^2 t}$

B) $\frac{1}{\cos t\,(9 - \sin^2 t)}$

C) $\frac{-\cos t}{9 - \sin^2 t}$

D) $\frac{\cos t}{9 - \sin^2 t}$

Evaluate the integral.

81) $\int_{1/4}^{3} \left(4 - \frac{1}{x}\right) dx$ 81) _______

A) $11 - \ln 1.33333333$

B) $11 - \ln 0.75$

C) $12 - \ln 12$

D) $11 - \ln 12$

82) $\int_{0}^{\pi/2} 17 \sin x\, dx$ 82) _______

A) 0 B) 1 C) 17 D) −17

83) $\int_{-\pi/4}^{3\pi/4} 8 \sec \theta \tan \theta\, d\theta$ 83) _______

A) $-8\sqrt{2}$ B) 0 C) $8\sqrt{2}$ D) $-16\sqrt{2}$

Find the total area of the region between the curve and the x-axis.

84) $y = x^2 - 6x + 9;\; 2 \le x \le 4$ 84) _______

A) $\frac{1}{3}$ B) $\frac{4}{3}$ C) $\frac{7}{3}$ D) $\frac{2}{3}$

Solve the problem.

85) Suppose that $\int_{1}^{x} f(t)\, dt = 5x^2 + 7x - 3$. Find f(x). 85) _______

A) $10x + 7$

B) $\frac{5}{3}x^3 + \frac{5}{3}x^2 - 3x - 9$

C) $5x^2 + 7x - 3$

D) $\frac{5}{3}x^3 + \frac{7}{2}x^2 - 3x$

Use the Trapezoidal Rule to estimate the integral.

86) $\int_0^2 3x^2\,dx$, n = 4 86) _______

A) $\frac{33}{2}$ B) $\frac{45}{4}$ C) 8 D) $\frac{33}{4}$

Find the general solution to the exact differential equation.

87) $\frac{dy}{du} = u^7 - \frac{1}{u^7}$ 87) _______

A) $y = \frac{u^8}{8} + \frac{1}{6u^6} + C$

B) $y = 7u^6 + \frac{1}{7u^6} + C$

C) $y = \frac{u^8}{7} + \frac{1}{6u^6} + C$

D) $y = \frac{u^8}{8} - \frac{1}{8u^8} + C$

Solve the initial value problem explicitly.

88) $\frac{dy}{dx} = 6x^2 - 4x + 4$; $y = 15$ when $x = 1$ 88) _______

A) $y = 2x^3 - 4x^2 + 4x + 13$

B) $y = 6x^3 - 4x^2 + 4x + 9$

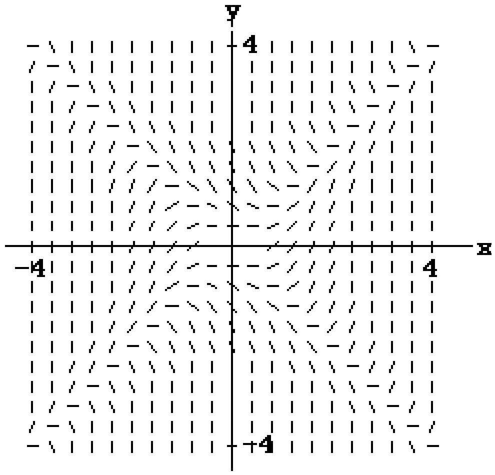
C) $y = 2x^3 - 2x^2 + 4x + 11$

D) $y = 2x^3 - 2x^2 + 4x - 11$

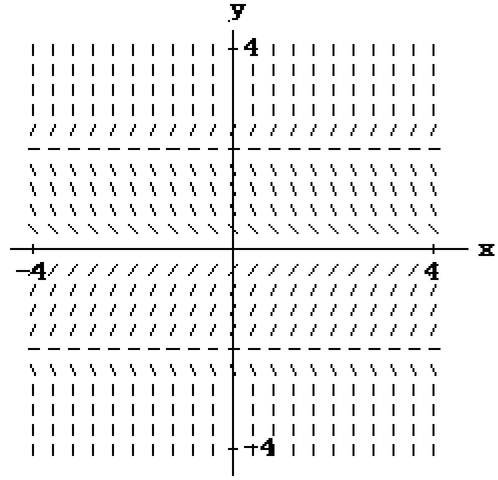
Match the differential equation with the appropriate slope field.

89) $y' = \dfrac{x}{y}$ 89) _______

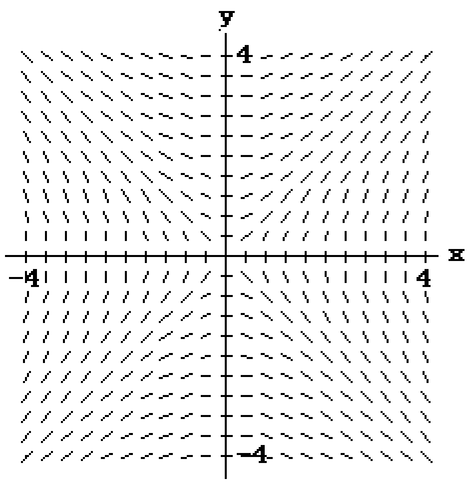
A)



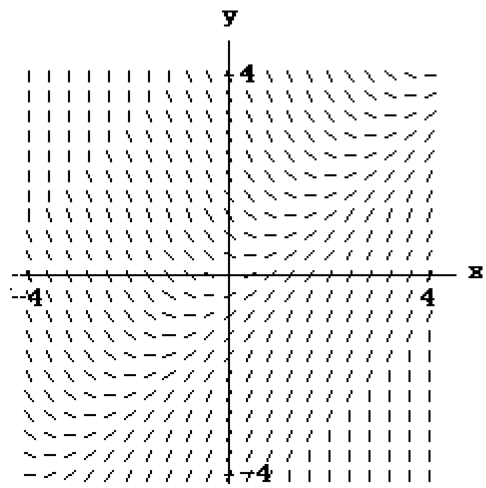
B)



C)



D)



Use Euler's method to solve the initial value problem.

90) $\dfrac{dy}{dx} = y - 5$ and $y = 4$ when $x = 1$ 90) _______

Use Euler's method with increments of $\Delta x = 0.1$ to approximate the value of y when $x = 1.3$.

A) 3.749 B) 3.799 C) 3.669 D) 3.459

Evaluate the integral.

91) $\displaystyle\int \frac{dx}{(7 - x)^6}$ 91) _______

A) $-\dfrac{1}{5(7 - x)^5} + C$ B) $\dfrac{5}{(7 - x)^5} + C$ C) $\dfrac{1}{5(7 - x)^5} + C$ D) $\dfrac{6}{(7 - x)^7} + C$

92) $\int \sin(5x - 8)\,dx$ 92) _______

A) $-\frac{1}{5}\cos(5x - 8) + C$

B) $\frac{1}{5}\cos(5x - 8) + C$

C) $5\cos(5x - 8) + C$

D) $-\cos(5x - 8) + C$

93) $\int \frac{\cos(4\theta + 5)}{\sin^2(4\theta + 5)}d\theta$ 93) _______

A) $\frac{1}{\sin(4\theta + 5)} + C$

B) $-\frac{\cos(4\theta + 5)}{4\sin(4\theta + 5)} + C$

C) $-\frac{1}{4\sin(4\theta + 5)} + C$

D) $\frac{1}{4\sin(4\theta + 5)} + C$

94) $\int x\sin 10x\,dx$ 94) _______

A) $\frac{1}{10}x\cos 10x - \frac{1}{100}\sin 10x + C$

B) $-\frac{1}{10}x\cos 10x + \frac{1}{100}\sin 10x + C$

C) $-\frac{1}{10}x\cos 10x + \frac{1}{10}\sin 10x + C$

D) $-\frac{1}{10}x\cos 10x - \frac{1}{100}x\sin 10x + C$

Use parts and solve for the unknown integral.

95) $\int e^{7x}\sin x\,dx$ 95) _______

A) $\frac{e^{7x}(7\sin x - \cos x)}{50} + C$

B) $\frac{e^{7x}(7\sin x + \cos x)}{50} + C$

C) $\frac{e^{7x}(7\sin x - \cos x)}{15} + C$

D) $\frac{e^{7x}(\sin x - 7\cos x)}{50} + C$

Answer Key
Testname: SEMEXAM REVFALL07

1) D
2) B
3) B
4) C
5) C
6) B
7) D
8) B
9) A
10) B
11) D
12) C
13) D
14) D
15) A
16) D
17) D
18) C
19) C
20) B
21) C
22) C
23) B
24) D
25) C
26) D
27) D
28) C
29) D
30) B
31) B
32) C
33) B
34) B
35) B
36) B
37) C
38) C
39) B
40) B
41) C
42) B
43) C
44) C
45) A
46) D
47) B
48) A
49) A
50) A
51) D
52) D
53) C
54) D
55) C
56) A
57) C
58) D
59) C
60) C
61) A

62) A
63) C
64) A
65) A
66) D
67) B
68) C
69) A
70) C
71) C
72) A
73) A
74) A
75) B
76) D
77) C
78) A
79) C
80) D
81) D
82) C
83) D
84) D
85) A
86) D
87) A
88) C
89) C
90) C
91) C
92) A
93) C
94) B
95) A