Exam

Name_____

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

Solve the problem.

1) Red Plains Roasting has found that the cost, in dollars per pound, of the peanuts it roasts, is 1) _____
$c(x) = -0.015x + 7.50$, for $x \le 500$,
where x is the number of pounds of peanuts roasted. Find the total cost of roasting 300 lb of peanuts.

A) \$1575.00 B) \$5.25 C) \$3150.00 D) \$3.00

2) A special–events promoter sells x tickets and has a marginal–revenue function given by 2) _____
$R'(x) = 4x - 1240$, where R'(x) is in dollars per ticket.
This means that the rate of change of total revenue with respect to the number of tickets sold, x, is R'(x). Find the total revenue from the sale of the first 340 tickets.

A) \$194,000 B) \$231,200 C) –\$380,800 D) –\$190,400

3) 3) _____
Decor Woodworkers knows that their marginal cost of producing x feet of custom molding is given by
$C'(x) = -0.00003x^2 - 0.05x + 90$, for $x \le 1000$,
where C'(x) is in cents. Approximate their total cost, in dollars, of manufacturing 1000 ft of molding, using 4 subintervals over [0, 1000] and the left endpoint of each subinterval.

A) \$646.88 B) \$258.75 C) \$712.39 D) \$1021.88

4) Satterfield Pavement's marginal cost, in dollars, of paving a road with asphalt is given by 4) _____
$C'(x) = \frac{3}{8}x^2 - 30x + 2100$, for $x \le 20$,
where x is measured in hundreds of feet. Use 4 subintervals over [0, 10] and the left endpoint of each subinterval to approximate the total cost of paving 1000 ft of road.

A) \$19,902.34 B) \$22,152.34 C) \$19,879.69 D) \$7960.94

Approximate the area under the graph of f(x) over the specified interval by dividing the interval into the indicated number of subintervals and using the left endpoint of each subinterval.

5) $f(x) = 0.2x^3 + 0.3x^2 - 0.5x - 1$; interval [2, 5]; 3 subintervals 5) _____

A) 21.0 B) 49.2 C) 30.0 D) 50.0

Evaluate.

6) $\int (10t^2 + 5t - 5)\,dt$ 6) _____

A) $5t^3 + 5t^2 - 5t + C$ B) $10t^3 + 5t^2 - 5t + C$

C) $\frac{10}{3}t^3 + \frac{5}{2}t^2 - 5t + C$ D) $20t + 5 + C$

7) $\int (x - 5)^2\,dx$ 7) _____

A) $\frac{1}{3}x^3 + 25x + C$

B) $\frac{1}{3}x^3 - 5x^2 + 25x + C$

C) $3x^3 - 20x^2 + 25x + C$

D) $\frac{1}{3}x^3 + 5x^2 - 25x + C$

8) $\int 11x^{-6}\,dx$ 8) _____

A) $-66x^{-7} + C$

B) $\frac{55}{x^5} + C$

C) $-\frac{11}{5}x^{-5} + C$

D) $\frac{11}{5x^7} + C$

9) $\int \frac{162}{x}\,dx$ 9) _____

A) $162x + C$

B) $81x^{-2} + C$

C) $162 \ln x + C$

D) $\ln\left(\frac{x}{162}\right) + C$

10) $\int 8x^{1/3}\,dx$ 10) _____

A) $\frac{8}{3}x^{4/3} + C$

B) $2x^4 + C$

C) $8x^{4/3} + C$

D) $6x^{4/3} + C$

11) $\int \frac{28x}{\sqrt{x}}\,dx$ 11) _____

A) $\frac{14}{3}x^{1/2} + C$

B) $\frac{56}{3}x^{3/2} + C$

C) $\frac{28}{3}x^{3/2} + C$

D) $\frac{28}{3}x^{1/2} + C$

12) $\int (x^4 + e^{5x})\,dx$ 12) _____

A) $\frac{x^5}{5} + \frac{e^{6x}}{6} + C$

B) $\frac{x^3}{3} + 5e^{5x} + C$

C) $\frac{x^5}{5} + \frac{e^{5x}}{5} + C$

D) $\frac{x^5}{5} + e^{5x} + C$

Find f such that the given conditions are satisfied.

13) $f'(x) = x^2 + 6,\ f(3) = 47$ 13) _____

A) $f(x) = x^3 + 6x^2 + 20$

B) $f(x) = \frac{x^3}{3} + 6x$

C) $f(x) = x^3 + 6x + 2$

D) $f(x) = \frac{x^3}{3} + 6x + 20$

14) $f'(x) = \sqrt{x} - \frac{1}{\sqrt{x}},\ f(9) = 30$ 14) _____

A) $f(x) = x^{3/2} - 2\sqrt{x} + 18$

B) $f(x) = \frac{2}{3}x^{3/2} - \sqrt{x} + 15$

C) $f(x) = \frac{2}{3}x^{3/2} - 2\sqrt{x} + 18$

D) $f(x) = \frac{1}{2}x^2 - 2\sqrt{x}$

Solve the problem.

15) Find a company's cost function if its marginal cost function is $C'(x) = 14x - 9$ and its fixed cost is \$ 12. 15) _____

A) $C(x) = 7x^2 - 9x + 11$

B) $C(x) = 7x^2 - 9x + 12$

C) $C(x) = 14x^2 - 9x + 11$

D) $C(x) = 14x^2 - 9x + 12$

Evaluate the indefinite integral.

16) $\int (5 + t)\sqrt{t}\, dt$ 16) _____

A) $5t^{3/2} + t^{5/2} + C$

B) $\frac{10}{3}t^{3/2} + \frac{1}{2}t^2 + C$

C) $\frac{15}{2}t^{3/2} + \frac{5}{2}t^{5/2} + C$

D) $\frac{10}{3}t^{3/2} + \frac{2}{5}t^{5/2} + C$

17) $\int \frac{x^4 - 9x + 7}{x^2}\, dx$ 17) _____

A) $\frac{x^3}{3} - \frac{9}{2}x^2 - \frac{7}{x} + C$

B) $x^3 - 9 \ln|x| + \frac{7}{x} + C$

C) $\frac{x^3}{3} - 9 \ln|x| - \frac{7}{x} + C$

D) $\frac{x^3}{3} + \frac{9}{x^2} - \frac{14}{x^3} + C$

18) $\int (x - 2)(7x + 1)\, dx$ 18) _____

A) $\frac{7}{3}x^3 - 7x^2 - 2x + C$

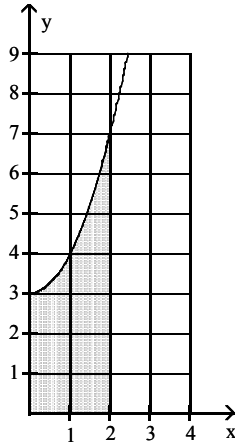
B) $\frac{7}{3}x^3 - \frac{13}{2}x^2 - 2x + C$

C) $14x - 13 + C$

D) $7x^3 - 13x^2 - 2x + C$

Find the area under the given curve over the indicated interval.

19) $y = x^2 + 3;\ [0, 2]$ 19) _____



A) $\frac{23}{3}$

B) $\frac{22}{3}$

C) $\frac{25}{3}$

D) $\frac{26}{3}$

Find the area under the graph of the function over the interval given.

20) $y = \frac{1}{\sqrt{x}}$; [1, 4] 20) _____

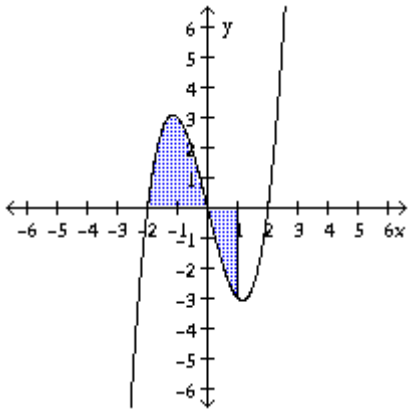
A) $\frac{1}{4}$ B) 4 C) $\frac{1}{2}$ D) 2

21) $y = \frac{9}{x}$; [1, 6] 21) _____

A) 9 ln 6 B) 6 ln 9 C) ln 54 D) ln 6

Evaluate the definite integral and interpret the result.

22) $\int_{-2}^{1} (x^3 - 4x)\, dx$ 22) _____



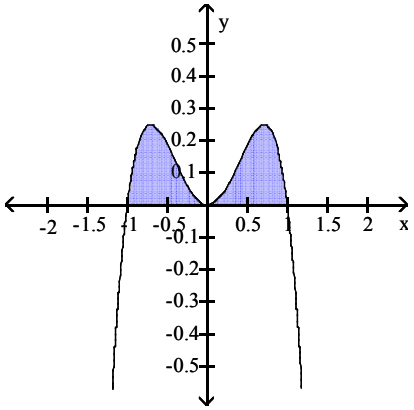
A) –9; the area under the graph of $y = x^3 - 4x$ over the interval [–2, 1] is –9.

B) $\frac{9}{4}$; the area between the x–axis and the graph of $y = x^3 - 4x$ over the interval [–2, 1] is $\frac{9}{4}$.

C) $\frac{9}{4}$; the area between the x–axis and the graph of $y = x^3 - 4x$ over the interval [–2, 0] minus the area between the x–axis and the graph of $y = x^3 - 4x$ over the interval [0, 1] is $\frac{9}{4}$.

D) –3; the area between the x–axis and the graph of $y = x^3 - 4x$ over the interval [–2, 0] minus the area between the x–axis and the graph of $y = x^3 - 4x$ over the interval [0, 1] is –3.

23) $\int_{-1}^{1} (x^2 - x^4)\,dx$ 23) _____



A) $-\frac{2}{15}$; the area bounded by the x-axis and the graph of $y = x^2 - x^4$ is $-\frac{2}{15}$.

B) $\frac{4}{15}$; the area bounded by the x-axis and the graph of $y = x^2 - x^4$ is $\frac{4}{15}$.

C) $-\frac{1}{15}$; the area bounded by the x-axis and the graph of $y = x^2 - x^4$ is $-\frac{1}{15}$.

D) $\frac{2}{15}$; the area bounded by the x-axis and the graph of $y = x^2 - x^4$ is $\frac{2}{15}$.

Evaluate.

24) $\int_{0}^{b} 7x^6\,dx$ 24) _____

A) $7b^7$ B) b^7 C) $\frac{1}{7}b^7$ D) b^5

25) $\int_{1}^{e} \frac{7}{x}\,dx$ 25) _____

A) 7 B) 0 C) $-\frac{7}{2}e^2$ D) –7

26) $\int_{-1}^{5} 5x^4\,dx$ 26) _____

A) –3126 B) 126 C) 15,630 D) 3126

27) $\int_{0}^{3} \sqrt{3x}\,dx$ 27) _____

A) 9 B) 3 C) $\frac{27}{2}$ D) 6

28) $\int_1^3 \frac{x^5 - x^{-1}}{x^2}\,dx$ 28) _____

A) $\frac{176}{9}$ B) $\frac{704}{9}$ C) $\frac{731}{36}$ D) $\frac{1403}{72}$

29) $\int_1^4 \frac{t^2 + 1}{\sqrt{t}}\,dt$ 29) _____

A) 32 B) $\frac{72}{5}$ C) $\frac{77}{5}$ D) $\frac{92}{5}$

Solve the problem.

30) A manufacturer determined that its marginal cost per unit produced is given by the function 30) _____
$C'(x) = 0.0006x^2 - 0.4x + 88$.
Find the total cost of producing the 101st unit through the 200th unit.

A) \$4900 B) \$4200 C) \$4146.14 D) \$5600

31) An object moves in such a way that its velocity (in m/s) after time t (in sec.) is given by 31) _____
$v = t^2 + 5t + 9$.
Find the distance traveled by the object during the first four seconds.

A) 61.3 m B) 76.0 m C) 97.3 m D) 45.0 m

32) EXTRA CREDIT?: A car accelerates at a constant rate from 0 mph to 55 mph in 30 sec. How far does the car travel during this time? 32) _____

A) B) C) D)

Find the area bounded by the given curves.

33) $y = 2x - x^2$, $y = 2x - 4$ 33) _____

A) $\frac{32}{3}$ B) $\frac{34}{3}$ C) $\frac{37}{3}$ D) $\frac{31}{3}$

34) $y = x^3$, $y = 4x$ 34) _____

A) 8 B) 16 C) 4 D) 2

Find the average value over the given interval.

35) $y = 4x^5$; [−2, 2] 35) _____

A) 0 B) $\frac{256}{3}$ C) $\frac{32}{3}$ D) $\frac{64}{3}$

36) $y = e^{-x}$; [0, 6] 36) _____

A) $\frac{1 - e^{-6}}{6}$ B) e^{-3} C) $\frac{e^{-6} - 1}{6}$ D) $1 - e^{-6}$

Evaluate using the substitution method.

37) $\int \frac{x^3}{4x^4 + 3}\,dx$ 37) _____

A) $\frac{1}{4}\ln\left|4x^4 + 3\right| + C$

B) $\frac{1}{16}\ln\left|4x^4 + 3\right| + C$

C) $16\ln\left|4x^4 + 3\right| + C$

D) $16\ln(4x^4 + 3) + C$

38) $\int \frac{x\,dx}{(7x^2 + 3)^5}$ 38) _____

A) $-\frac{7}{3}(7x^2 + 3)^{-4} + C$

B) $-\frac{7}{3}(7x^2 + 3)^{-6} + C$

C) $-\frac{1}{56}(7x^2 + 3)^{-4} + C$

D) $-\frac{1}{14}(7x^2 + 3)^{-6} + C$

39) $\int \frac{19}{2 + 5y}\,dy$ 39) _____

A) $19\ln\left|2 + 5y\right| + C$

B) $\frac{18}{5}\ln\left|2 + 5y\right| + C$

C) $\frac{19}{5}\ln\left|2 + 5y\right| + C$

D) $18\ln\left|2 + 5y\right| + C$

40) $\int \frac{(\ln x)^3}{x}\,dx$ 40) _____

A) $\frac{(\ln x)^2}{2} + C$ B) $(\ln x)^4 + C$ C) $\frac{(\ln x)^4}{4} + C$ D) $\frac{(\ln x)^4}{4x} + C$

41) $\int x^2\sqrt{x^3 + 6}\,dx$ 41) _____

A) $2(x^3 + 6)^{3/2} + C$

B) $-\frac{2}{3}(x^3 + 6)^{-1/2} + C$

C) $\frac{2}{9}(x^3 + 6)^{3/2} + C$

D) $\frac{2}{3}(x^3 + 6)^{3/2} + C$

42) $\int (x^6 - 2x^5)^6(6x^5 - 10x^4)\,dx$ 42) _____

A) $(x^6 - 2x^5)^7 + C$

B) $6x^5 - 10x^4 + C$

C) $\frac{1}{7}(x^6 - 2x^5)^7 + C$

D) $\frac{1}{6}(x^6 - 2x^5)^6 + C$

Solve the problem.

43) The first derivative of a person's body temperature, with respect to the dosage of x milligrams of a drug, is given by $D'(x) = \frac{8}{x+3}$. One milligram raises the temperature 2.4° C. Find the function D(x) giving the total change in temperature as a function of x. 43) _____

A) $D(x) = \ln\left|\frac{8}{x+3}\right| + 8.7$

B) $D(x) = 8 \ln|x+3| - 8.7$

C) $D(x) = \ln\left|\frac{8}{x+3}\right| - 2.4$

D) $D(x) = 8 \ln|x+3| + 2.4$

44) The rate of growth of profit (in millions) from an invention is approximated by $P'(x) = xe^{-x^2}$, where x represents time in years. The total profit in year 2 that the invention is in operation is $ 15,000. Find the total profit function P(x). 44) _____

A) $P(x) = -0.5e^{-x^2} + 24{,}000$

B) $P(x) = -\frac{1}{2}e^{-x^2} - 0.024$

C) $P(x) = -0.5e^{-x^2} + 0.024$

D) $P(x) = -\frac{1}{2}e^{-x^2} - 24{,}000$

Evaluate using integration by parts.

45) $\int 7xe^x\,dx$ 45) _____

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

46) $\int e^{2x}x^2\,dx$ 46) _____

A) $\frac{1}{2}x^2e^{2x} - xe^{2x} + \frac{1}{4}e^{2x} + C$

B) $\frac{1}{2}x^2e^{2x} - \frac{1}{4}xe^{2x} + \frac{1}{4}e^{2x} + C$

C) $\frac{1}{2}x^2e^{2x} - \frac{1}{2}xe^{2x} + \frac{1}{4}e^{2x} + C$

D) $\frac{1}{2}x^2e^{2x} - \frac{1}{2}xe^{2x} + C$

47) $\int x^4 \ln 3x\,dx$ 47) _____

A) $\frac{1}{5}x^5 \ln 3x + \frac{1}{25}x^5 + C$

B) $\ln 3x - \frac{1}{5}x^5 + C$

C) $\frac{1}{5}x^5 \ln 3x - \frac{1}{30}x^6 + C$

D) $\frac{1}{5}x^5 \ln 3x - \frac{1}{25}x^5 + C$

48) $\int x\sqrt{5-x}\,dx$ 48) _____

A) $-\frac{2}{3}x(5-x)^{3/2} - \frac{4}{15}(5-x)^{5/2} + C$

B) $-\frac{2}{3}x(5-x)^{3/2} - \frac{2}{5}(5-x)^{5/2} + C$

C) $\frac{2}{3}x(5-x)^{3/2} + \frac{4}{15}(5-x)^{5/2} + C$

D) $-\frac{2}{3}x(5-x)^{3/2} + \frac{4}{15}(5-x)^{5/2} + C$

49) $\int (2x + 3)\, e^{-6x}\, dx$ 49) _____

A) $\frac{1}{3}x\, e^{-6x} + \frac{5}{9}e^{-6x} + C$

B) $-12x\, e^{-6x} - 90\, e^{-6x} + C$

C) $-\frac{1}{3}x\, e^{-6x} - \frac{5}{9}e^{-6x} + C$

D) $-\frac{1}{3}\, x\, e^{-6x} - e^{-6x} + C$

Find the integral.

50) $\int_0^4 (x - 3)\ \ln x\, dx$ 50) _____

A) −3.61 B) −4.91 C) 7.09 D) 2.45

Solve the problem.

51) The rate of growth of a microbe population is given by $m'(x) = 30xe^{2x}$, where x is time in days. What is the change in population in the first 3 days? 51) _____

A) 15,129 B) 30,272 C) 60,544 D) 15,136

52) The rate of water usage for a business, in gallons per day, is given by $W(t) = 695te^{-t}$, where t = the number of hours since midnight. Approximately how many gallons of water does the business use in the first 7 hours of the day? 52) _____

A) 690 gallons B) 5 gallons C) 700 gallons D) 691 gallons

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

51) D
52) A