MAC 2233 -- Lial
Practice for Exam
7.1 – 7.4, 8.1

Name ______________________
Date ______________________

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

Find the integral.

1) $\int x^{12}\ dx$ 1) ________

A) $12x^{11} + C$
B) $13x^{13} + C$
C) $\dfrac{x^{13}}{13} + C$
D) $\dfrac{x^{11}}{12} + C$

2) $\int 29\ dx$ 2) ________

A) $\dfrac{29}{2}x^2$
B) 0
C) $29 + C$
D) $29x + C$

3) $\int 12x^3\sqrt{x}\ dx$ 3) ________

A) $\dfrac{24}{7}x^{9/2} + C$
B) $\dfrac{8}{3}x^{9/2} + C$
C) $\dfrac{2}{9}x^{9/2} + C$
D) $\dfrac{11}{5}x^{9/2} + C$

4) $\int \dfrac{34}{x^2}\ dx$ 4) ________

A) $-34x + C$
B) $\dfrac{34}{x} + C$
C) $-\dfrac{34}{x} + C$
D) $34x + C$

5) $\int (8x^2 + 1)\ dx$ 5) ________

A) $x + C$
B) $16x + C$
C) $\dfrac{8}{3}x^3 + C$
D) $\dfrac{8}{3}x^3 + x + C$

6) $\int (3x^8 - 7x^3 + 4)\ dx$ 6) ________

A) $9x^9 - \dfrac{7}{4}x^4 + 4x + C$
B) $\dfrac{1}{3}x^9 - \dfrac{7}{3}x^4 + 4x + C$
C) $\dfrac{1}{3}x^9 - \dfrac{7}{4}x^4 + 4x + C$
D) $9x^9 - \dfrac{7}{3}x^4 + 4x + C$

7) $\int (5x^2 + x^{-3})\ dx$ 7) ________

A) $-\dfrac{5x^3}{3} - \dfrac{x^{-2}}{2} + C$
B) $\dfrac{5x^3}{3} - \dfrac{x^{-2}}{2} + C$
C) $-\dfrac{5x^3}{3} + \dfrac{x^{-2}}{2} + C$
D) $\dfrac{5x^3}{3} + \dfrac{x^{-2}}{2} + C$

8) $\int (\sqrt{x} + \sqrt[3]{x})\, dx$ 8) ________

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

B) $2\sqrt{x} + 2\sqrt[3]{x} + C$

C) $2\sqrt{x} + 3\sqrt[3]{x} + C$

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

9) $\int \left(\sqrt{x} + \frac{1}{x^4}\right) dx$ 9) ________

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

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

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

D) $2x\sqrt{x} - \frac{1}{4x^4} + C$

10) $\int 8e^{4y}\, dy$ 10) ________

A) $\frac{1}{4}e^{4y} + C$

B) $2e^{4y} + C$

C) $\frac{1}{2}e^{4y} + C$

D) $4e^{4y} + C$

11) $\int (t^3 + e^{5t})\, dt$ 11) ________

A) $\frac{t^4}{4} + \frac{e^{6t}}{6} + C$

B) $\frac{t^2}{2} + 5e^{5t} + C$

C) $\frac{t^4}{4} + e^{5t} + C$

D) $\frac{t^4}{4} + \frac{e^{5t}}{5} + C$

12) $\int (9x^{-5} - 3x^{-1})\, dx$ 12) ________

A) $\frac{9}{5}x^{-4} + 3 \ln|x| + C$

B) $-\frac{9}{4}x^{-4} + 3 \ln|x| + C$

C) $\frac{9}{5}x^{-4} - 3 \ln|x| + C$

D) $-\frac{9}{4}x^{-4} - 3 \ln|x| + C$

13) $\int (3x + 5x^{-1})\, dx$ 13) ________

A) $\frac{3}{2}x^2 + 5 \ln|x| + C$

B) $3x^3 + 30x - \frac{25}{3}x^{-1} + C$

C) $\frac{9}{4}x^4 + 25 \ln|x^2| + C$

D) $3x^3 + 15x - \frac{25}{3}x^{-1} + C$

14) $\int \left(\frac{x}{6} + \frac{6}{x}\right) dx$ 14) ________

A) $\frac{1}{6}x + C$

B) $x \ln 6 + 6 \ln|x| + C$

C) $\frac{1}{12}x^2 + 6 \ln|x| + C$

D) $x + C$

15) $\int \frac{x^5 + 1}{x}\,dx$ 15) _______

A) $\frac{1}{3}x^4 - \ln|x| + C$ B) $\frac{1}{5}x^5 + \ln|x| + C$ C) $\frac{1}{3}x^4 + \ln|x| + C$ D) $\frac{1}{5}x^5 - \ln|x| + C$

16) $\int \left(\frac{4}{x} - 2e^{-0.7x}\right)dx$ 16) _______

A) $-\frac{4}{x^2} + \frac{7}{5}e^{-0.7x} + C$ B) $4 \ln|x| + \frac{20}{7}e^{-0.7x} + C$

C) $\frac{8}{x^2} - \frac{7}{5}e^{-0.7x} + C$ D) $4 \ln|x| - \frac{20}{7}e^{-0.7x} + C$

Solve the problem.

17) Find the cost function if the marginal cost function is $C'(x) = 4x - 3$ and the fixed cost is \$10. 17) _______

A) $C(x) = 4x^2 - 3x + 10$ B) $C(x) = 2x^2 - 3x + 9$

C) $C(x) = 4x^2 - 3x + 9$ D) $C(x) = 2x^2 - 3x + 10$

18) The rate at which an assembly line worker's efficiency E (expressed as a percent) changes with respect to time t is given by $E'(t) = 65 - 8t$, where t is the number of hours since the worker's shift began. Assuming that $E(1) = 96$, find E(t). 18) _______

A) $E(t) = 65t - 8t^2 + 35$ B) $E(t) = 65t - 4t^2 + 157$

C) $E(t) = 65t - 4t^2 + 96$ D) $E(t) = 65t - 4t^2 + 35$

19) Suppose that an object's acceleration function is given by $a(t) = 8t + 9$. The object's initial velocity, v(0), is 5, and the object's initial position, s(0), is 9. Find s(t). 19) _______

A) $s(t) = \frac{4}{3}t^3 + \frac{9}{2}t^2 + 5t + 9$ B) $s(t) = \frac{8}{3}t^3 + \frac{9}{2}t^2 + 9t + 5$

C) $s(t) = 4t^2 + 9t + 5$ D) $s(t) = \frac{4}{3}t^3 + \frac{9}{2}t^2 + 5t$

20) A company has found that its expenditure rate per day (in hundreds of dollars) on a certain type of job is given by $E'(x) = 8x + 8$, where x is the number of days since the start of the job. Find the expenditure if the job takes 8 days. 20) _______

A) \$320 B) \$32,000 C) \$72 D) \$7200

21) The population of a city, in millions, since 1990 has grown at a rate of $P'(t) = 0.39e^{0.011t}$ million people per year, where t is the number of years after 1990. If there were 1.93 million people in 2000, estimate (to two decimal places) the population in 2005. 21) _______

A) $P(15) \approx -37.65$ million B) $P(15) \approx 41.81$ million

C) $P(15) \approx 4.17$ million D) $P(15) \approx 79.46$ million

Find the integral.

22) $\int 4(2x + 5)^3\,dx$ 22) _______

A) $\frac{1}{4}(2x + 5)^4 + C$ B) $\frac{3}{4}(2x + 5)^4 + C$ C) $\frac{1}{2}(2x + 5)^4 + C$ D) $\frac{3}{8}(2x + 5)^4 + C$

23) $\int \frac{8\,dy}{(y-9)^3}$ 23) _______

A) $\frac{2}{(y-9)^4} + C$ B) $\frac{-2}{(y-9)^4} + C$ C) $\frac{4}{(y-9)^2} + C$ D) $\frac{-4}{(y-9)^2} + C$

24) $\int \frac{dr}{\sqrt{6r-7}}$ 24) _______

A) $\frac{1}{3}\sqrt{6r-7} + C$ B) $\frac{1}{2}\sqrt{6r-7} + C$ C) $\frac{1}{4}\sqrt{6r-7} + C$ D) $\frac{1}{6}\sqrt{6r-7} + C$

25) $\int \frac{x}{(7x^2+3)^5}\,dx$ 25) _______

A) $\frac{-1}{56(7x^2+3)^4} + C$ B) $\frac{-7}{3(7x^2+3)^6} + C$

C) $\frac{-1}{14(7x^2+3)^6} + C$ D) $\frac{-7}{3(7x^2+3)^4} + C$

26) $\int \frac{e^x}{e^x + e}\,dx$ 26) _______

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

27) $\int te^{-7t^2}\,dt$ 27) _______

A) $-\frac{1}{14}e^{-7t^2} + C$ B) $\frac{1}{7}e^{-7t^2} + C$ C) $-\frac{1}{7}e^{-7t^2} + C$ D) $\frac{1}{14}e^{-7t^2} + C$

28) $\int \frac{5e^{1/y}}{3y^2}\,dy$ 28) _______

A) $10ye^{1/y} + C$ B) $-\frac{5e^{1/y}}{3} + C$ C) $\frac{5e^{1/y}}{3} + C$ D) $\frac{5e^{1/y}}{y^3} + C$

29) $\int \frac{3e^{\sqrt{z}}}{8\sqrt{z}}\,dz$ 29) _______

A) $-12e^{\sqrt{z}} + C$ B) $-24e^{\sqrt{z}} + C$ C) $\frac{3}{4}e^{\sqrt{z}} + C$ D) $\frac{3}{8}e^{\sqrt{z}} + C$

30) $\int \frac{e^{1/t^4}}{t^5}\,dt$ 30) _______

A) $-e^{1/t^4} + C$ B) $-\frac{e^{1/t^4}}{4t^4} + C$ C) $-\frac{e^{1/t^4}}{4} + C$ D) $\frac{e^{-1/t^4}}{4} + C$

31) $\int (x^7 - 2x^6)^4(7x^6 - 12x^5)\ dx$ 31) _______

A) $\frac{1}{4}(x^7 - 2x^6)^4 + C$

B) $7x^6 - 12x^5 + C$

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

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

Solve the problem.

32) The slope of the tangent line of a curve is given by 32) _______

$f'(x) = x^2 - 7x + 5.$

If the point (0, 5) is on the curve, find an equation of the curve.

A) $f(x) = \frac{1}{3}x^3 - \frac{7}{2}x^2 + 5x + 5$

B) $f(x) = \frac{1}{3}x^3 - \frac{7}{2}x^2 + 5x + 1$

C) $f(x) = \frac{1}{3}x^3 - 8x^2 + 5x + 1$

D) $f(x) = \frac{1}{3}x^3 - 8x^2 + 5x + 5$

Find the integral.

33) $\int x^5\sqrt{x^6 + 5}\ dx$ 33) _______

A) $4(x^6 + 5)^{3/2} + C$

B) $-\frac{1}{3}(x^6 + 5)^{-1/2} + C$

C) $\frac{1}{9}(x^6 + 5)^{3/2} + C$

D) $\frac{2}{3}(x^6 + 5)^{3/2} + C$

34) $\int x^2\sqrt{x^3 + 4}\ dx$ 34) _______

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

B) $\frac{2}{9}x^3(x^3 + 4)^{3/2} + C$

C) $\frac{2}{9}(x^3 + 4)^{3/2} + C$

D) $\frac{1}{6\sqrt{x^3 + 4}} + C$

35) $\int \frac{x^2 + 18x}{(x + 9)^2}\ dx$ 35) _______

A) $\frac{81}{x + 9} + C$

B) $x + \frac{81}{x + 9} + C$

C) $x + \frac{9}{x + 9} + C$

D) $x + \frac{162}{(x + 9)^3} + C$

36) $\int \frac{6x}{(x + 6)^5}\ dx$ 36) _______

A) $6 \ln|x + 6|^4 - 36 \ln|x + 6|^5 + C$

B) $6 \ln|x + 6| + C$

C) $-\frac{2}{(x + 6)^3} + \frac{9}{(x + 6)^4} + C$

D) $-\frac{3x}{(x + 6)^4} + C$

37) $\int \frac{(\ln x)^6}{x}\,dx$ 37) _______

A) $(\ln x)^7 + C$ B) $\frac{(\ln x)^5}{5} + C$ C) $\frac{(\ln x)^7}{7x} + C$ D) $\frac{(\ln x)^7}{7} + C$

38) $\int \frac{\ln x^7}{x}\,dx$ 38) _______

A) $\frac{1}{7}(\ln x^7)^2 + C$ B) $\frac{1}{\ln x^7} + C$ C) $\frac{1}{14}(\ln x^7)^2 + C$ D) $\frac{1}{2}(\ln x^7)^2 + C$

39) $\int \frac{1}{x(\ln x)^{17}}\,dx$ 39) _______

A) $-\frac{1}{16x(\ln x)^{16}} + C$ B) $-\frac{1}{18(\ln x)^{18}} + C$

C) $\frac{1}{x(\ln x)^{18}} + C$ D) $-\frac{1}{16(\ln x)^{16}} + C$

40) $\int \frac{(6 + \ln x)^3}{x}\,dx$ 40) _______

A) $\frac{(6 + \ln x)^4}{4} + C$ B) $4x^2(6 + \ln x)^4 + C$

C) $\frac{(6 + \ln x)^4}{4x^2} + C$ D) $\frac{(6 + \ln x)^4}{4x} + C$

41) $\int \frac{\log_7 x}{x}$ 41) _______

A) $\frac{(\log_7 x)^2}{2 \ln 7} + C$ B) $\frac{(\log_7 x)^2}{2} + C$

C) $\frac{(\ln 7)(\log_7 x)^2}{2} + C$ D) $\frac{(\ln x)(\log_7 x)^2}{2} + C$

Approximate the area under the graph of f(x) and above the x–axis using n rectangles.

42) $f(x) = \frac{8}{x}$ from $x = 2$ to $x = 10$; $n = 4$; use right endpoints 42) _______

A) 16.67 B) 12.60 C) 19.20 D) 10.27

43) $f(x) = 2x + 3$ from $x = 0$ to $x = 2$; $n = 4$; use right endpoints 43) _______

A) 15 B) 17 C) 13 D) 11

44) $f(x) = e^{-x} + 6$ from $x = -2$ to $x = 6$; $n = 4$; use right endpoints 44) _______

A) 50.31 B) 65.09 C) 48.02 D) 54.29

45) $f(x) = 1 - x^2$ from $x = -1$ to $x = 1$; $n = 2$; use midpoints 45) _______

A) 2 B) 0.75 C) 0.5 D) 1.5

46) $f(x) = x^2 + 2$; interval $[0, 5]$; $n = 5$; use left endpoints 46) ________

A) 40 B) 32 C) 66 D) 65

Evaluate the definite integral.

47) $\int_{-2}^{4} 4\, dx$ 47) ________

A) 12 B) 6 C) 24 D) 8

48) $\int_{-1}^{3} (x + 5)\, dx$ 48) ________

A) 10 B) -24 C) 24 D) 15

49) $\int_{-1}^{0} (5 + x^2)\, dx$ 49) ________

A) -2 B) $\frac{16}{3}$ C) 0 D) 5

50) $\int_{0}^{9} 4\sqrt{x}\, dx$ 50) ________

A) 162 B) 108 C) 72 D) 18

51) $\int_{1}^{4} (x^{3/2} + x^{1/2} - x^{-1/2})\, dx$ 51) ________

A) $\frac{226}{15}$ B) 46 C) $\frac{44}{3}$ D) $\frac{224}{15}$

52) $\int_{-2}^{-1} 2x^{-4}\, dx$ 52) ________

A) $\frac{7}{12}$ B) 14 C) $\frac{7}{24}$ D) $\frac{1}{12}$

53) $\int_{1}^{2} \frac{x^5 - x^{-1}}{x^2}\, dx$ 53) ________

A) $\frac{33}{8}$ B) $\frac{27}{2}$ C) $\frac{27}{8}$ D) $\frac{103}{32}$

54) $\int_{4}^{9} \frac{t^2 + 1}{\sqrt{t}}\, dt$ 54) ________

A) $\frac{472}{5}$ B) 212 C) $\frac{447}{5}$ D) $\frac{432}{5}$

55) $\displaystyle\int_1^e \frac{16}{x}\,dx$ 55) ________

A) 0 B) -16 C) 16 D) $-16e^2$

56) $\displaystyle\int_0^2 x(x^2+1)^3\,dx$ 56) ________

A) $\frac{31}{2}$ B) 78 C) 156 D) 624

57) $\displaystyle\int_0^1 \frac{10r}{\sqrt{9+5r^2}}\,dr$ 57) ________

A) $2\sqrt{14}-6$ B) $\sqrt{14}-3$ C) $-2\sqrt{14}+6$ D) $\frac{\sqrt{14}}{2}-\frac{3}{2}$

Solve the problem.

58) A company has found that its rate of expenditure (in hundreds of dollars) on a certain type of job is given by 58) ________

$E'(x) = 12x + 11,$

where x is the number of days since the start of the job. Find the total expenditure if the job takes 5 days.

A) \$7100 B) \$205 C) \$71 D) \$20,500

59) A certain object moves in such a way that its velocity (in m/s) after time t (in s) is given by 59) ________

$v = t^2 + 5t + 5.$

Find the distance traveled during the first four seconds by evaluating $\displaystyle\int_0^4 (t^2+5t+5)\,dt$. Round your answer to the nearest tenth of a meter.

A) 60.0 m B) 81.3 m C) 61.3 m D) 41.0 m

60) A force acts on a certain object in such a way that when the object has moved a distance of r (in m), the force f (in newtons) is given by 60) ________

$f = 7r^2 + 5r.$

Find the work (in joules) done through the first four meters by evaluating $\displaystyle\int_0^4 (7r^2+5r)\,dr$.

A) 64 joules B) 189.3 joules C) 154.3 joules D) 40 joules

Use integration by parts to find the integral.

61) $\displaystyle\int 6xe^x\,dx$ 61) ________

A) $6e^x - 6xe^x + C$ B) $xe^x - 6e^x + C$ C) $6xe^x - 6e^x + C$ D) $6e^x - e^x + C$

62) $\int 7x \ln x \, dx$ 62) _______

A) $\frac{x^2}{2} \ln x - \frac{x^2}{4} + C$

B) $\frac{7}{2}x^2 \ln x - \frac{x^2}{4} + C$

C) $\frac{7}{2}x^2 \ln x - \frac{7}{4}x^2 + C$

D) $\frac{7}{2}x \ln x - \frac{7}{4}x + C$

63) $\int (x - 4) \ln x \, dx$ 63) _______

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

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

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

D) $\frac{1}{2}x^2 \ln x - \frac{1}{4}x^2 - 4x + C$

64) $\int (x - 8)e^{2x} dx$ 64) _______

A) $\frac{1}{2}(x - 8)e^{2x} + \frac{1}{4}e^{2x} + C$

B) $2(x - 8)e^{2x} - 4e^{2x} + C$

C) $(x - 8)e^{2x} - e^{2x} + C$

D) $\frac{1}{2}(x - 8)e^{2x} - \frac{1}{4}e^{2x} + C$

Use integration by parts to find the integral. Round the answer to two decimal places if necessary.

65) $\int_2^4 7x \ln x \, dx$ 65) _______

A) 46.93 B) 64.9 C) 11.06 D) 6.70

66) $\int_0^1 \frac{x}{\sqrt{x + 1}} \, dx$ 66) _______

A) −1.33 B) 0.39 C) −2.27 D) −0.94

67) $\int_1^2 (x - 8)e^{2x} dx$ 67) _______

A) −149.74 B) −740.57 C) −205.15 D) −323.07

68) $\int_2^4 x\sqrt{4 - x} \, dx$ 68) _______

A) −5.28 B) 4.53 C) 2.26 D) 5.28

69) $\int_0^6 xe^{-x} dx$ 69) _______

Give your answer in exact form.

A) $-7e^{-6}$ B) $-7e^{-6} + 1$ C) $-5e^{-6} + 1$ D) $-7e^{-6} - 1$

Find the integral by using integration by parts or other techniques. Round the answer to four decimal places if necessary.

70) $\int 11x^2 e^{2x}\,dx$ 70) _______

A) $\frac{11}{4}e^{2x}(2x^2 - 2x + 1) + C$ B) $11e^{2x}(2x^2 - 2x + 1) + C$

C) $\frac{11}{2}e^{2x}(2x^2 - 2x + 1) + C$ D) $\frac{11}{4}e^{2x}(x^2 - x + 1) + C$

71) $\int x^2\sqrt{x + 15}\,dx$ 71) _______

A) $\frac{(15x^2 - 180x + 1800)\sqrt{(x + 15)^3}}{105} + C$ B) $\frac{(30x^2 - 360x + 240)\sqrt{(x + 15)^3}}{105} + C$

C) $\frac{(30x^2 - 360x + 3600)\sqrt{(x + 15)}}{105} + C$ D) $\frac{(30x^2 - 360x + 3600)\sqrt{(x + 15)^3}}{105} + C$

Use integration by parts to find the integral.

72) $\int \frac{\ln 6x}{x^7}\,dx$ 72) _______

A) $-\frac{1}{6}x^{-6}\ln 6x - \frac{1}{30}x^{-5} + C$ B) $-\frac{1}{6}x^{-6}\ln 6x + \frac{1}{36}x^{-6} + C$

C) $-\frac{1}{6}x^{-6}\ln 6x - \frac{1}{36}x^{-6} + C$ D) $\ln 6x + \frac{1}{6}x^{-6} + C$

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

51) A
52) A
53) C
54) D
55) C
56) B
57) A
58) D
59) B
60) B
61) C
62) C
63) A
64) D
65) A
66) B
67) A
68) D
69) B
70) A
71) D
72) C