Exam

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

1) Determine: $\int \frac{3t^3 - 4t^2 - t + 1}{t^2}\,dt$ 1) _____

2) Determine: $\int \frac{x^2 + 6x - 3}{x}\,dx$ 2) _____

3) Determine: $\int 2^{3q+4}\,dq$ 3) _____

4) Determine: $\int \frac{z^2 - 3z + 5}{z + 2}\,dz$ 4) _____

5) Determine: $\int \frac{x^2 - 4x + 7}{x + 1}\,dx$ 5) _____

6) Determine: $\int \frac{x^2 + 2x - 5}{x + 3}\,dx$ 6) _____

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

7) $\int \frac{x^2 + 3x - 4}{x + 2}\,dx =$ 7) _____

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

B) $\frac{x^2}{2} + 5x + 6\ln|x + 2| + C$

C) $\frac{1}{3}\ln|x + 2| + C$

D) $\frac{x^2}{2} + x - 6\ln|x + 2| + C$

E) $\frac{1}{2}\ln|x + 2| + C$

8) $\int \frac{x^2 + 4x - 3}{x - 1}\,dx =$ 8) _____

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

B) $\frac{x^2}{2} + 5x + 2\ln|x - 1| + C$

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

D) $\frac{x^2}{2} + 6x + 3\ln|x - 1| + C$

E) $\frac{1}{3}\ln|x - 1| + C$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

9) Determine: $\int (x^3 + 3^x)\,dx$ 9) _____

10) If the marginal cost function is given by $C'(q) = \frac{3}{4} - \frac{1}{2\sqrt{3q}}$, find the cost function if $C(0) =$ 1000. 10) _____

11) Determine: $\int \frac{\ln(xe^{2x})}{x}\,dx$ 11) _____

12) The base of a triangle is decreasing at a rate of $\frac{db}{dt} = -\frac{3e^{-\sqrt{t}}}{\sqrt{t}}$. Find b as a function of t. 12) _____

13) A bacteria population is increasing at a rate of $\frac{dp}{dt} = 3t^2 2t^3$. Find p as a function of t. 13) _____

14) A bacteria population is increasing at a rate of $\frac{dp}{dt} = 4t^3 9t^4$. Find p as a function of t. 14) _____

15) Determine $\int \frac{7x^6 - 8x^4 + 9x^3}{2x^2}\,dx$ 15) _____

16) Determine $\int \frac{x^2 - 8x + 6}{x - 4}\,dx$ 16) _____

17) Determine $\int \frac{4x^2 + 4x + 2}{2x - 1}\,dx$ 17) _____

18) Determine $\int \frac{2x^2 + 13x + 13}{x + 5}\,dx$ 18) _____

19) Determine $\int \frac{x - 8}{x + 4}\,dx$ 19) _____

20) Determine $\int 4^{5x}\,dx$ 20) _____

21) Determine $\int 3^{7x-4}\,dx$ 21) _____

22) Determine $\int -2x \cdot 7^{9-x^2}\,dx$ 22) _____

23) Determine $\int \frac{5\sqrt{8x - 7}}{\sqrt{8x - 7}}\,dx$ 23) _____

24) Determine $\int (5x^2 + 4x)e^{5x^3+6x^2+7}\,dx$ 24) _____

25) Determine $\int \frac{(x^2 + 4x)\sqrt{\ln(x^3 + 6x^2 + 1)}}{x^3 + 6x^2 + 1}\,dx$ 25) _____

26) For the region in the first quadrant bounded by $f(x) = 2x + 1$, $x = 0$, $y = 0$, and $x = 1$, approximate the area by evaluating S_4. (Use the right-hand endpoint of each sub-interval.) 26) _____

27) For the region in the first quadrant bounded by $f(x) = x^2 + 2$, $y = 0$, $x = 0$, and $x = 1$, approximate the area by evaluating S_2. (Use the right-hand endpoint of each sub-interval.) 27) _____

28) For the region bounded by $f(x) = 4 - x$, $y = 0$, $x = 0$, and $x = 3$, approximate the area by evaluating S_6. (Use the right-hand endpoint of each subinterval.) 28) _____

29) Determine: $\int_{-1}^{4} (2x + 3)\,dx$ 29) _____

30) Determine: $\int_{-1}^{1} (x^2 - 2x + 2)\,dx$ 30) _____

31) Determine: $\int_{1}^{4} \left(\frac{x}{2} - \frac{2}{\sqrt{x}}\right) dx$ 31) _____

32) Determine: $\int_0^{1/4} (1 - 4x)^4 \, dx$ 32) _____

33) Determine: $\int_{-4}^{4} 3ze^{z^2 + 3} \, dz$ 33) _____

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

34) $\int_{-1}^{1} (x^2 + 2x + 1) \, dx$ = 34) _____

A) 0 B) 8 C) $\frac{8}{3}$ D) $\frac{16}{3}$ E) 16

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

35) A manufacturer's marginal cost function is $\frac{dc}{dq} = 0.6(0.2q - 20)^2$, where c is the total cost (in dollars) of producing q units of a product. If the manufacturer increases output from 50 units to 100 units, determine the change in total cost. 35) _____

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

36) $\int_0^1 x(x^2 + 5) \, dx$ = 36) _____

A) 18 B) 9 C) $\frac{11}{4}$ D) 11 E) $\frac{11}{2}$

37) $\int_1^3 \frac{t^3 + 2}{t^2} \, dt$ = 37) _____

A) $-\frac{16}{3}$ B) $-\frac{4}{3}$ C) $\frac{4}{3}$ D) $\frac{16}{3}$ E) $\frac{2}{9}$

38) $\int_0^1 \sqrt[3]{2x} \, dx$ = 38) _____

A) $4\sqrt[3]{2}$ B) 1 C) 0 D) $\frac{3\sqrt[3]{2}}{4}$ E) $\sqrt[3]{2}$

39) $\int_{-1}^{0} 4(x + 1)e^{(x+1)^2} \, dx$ = 39) _____

A) $1 - e$ B) 0 C) $2(e - 1)$ D) $e(3e - 2)$ E) $\frac{1}{2}(e - 1)$

40) $\int_2^3 \frac{4}{1 - 2x}\,dx$ = 40) _____

A) $-2 \ln \frac{5}{3}$ B) $2 \ln \frac{5}{3}$ C) $-4 \ln \frac{5}{3}$ D) $-8 \ln \frac{5}{3}$ E) $8 \ln \frac{5}{3}$

41) $\int_0^5 \frac{x}{x^2 + 1}\,dx$ = 41) _____

A) $\frac{1}{2} \ln 26$

B) $\frac{1}{2} \ln 24$

C) $\ln 26$

D) $\ln 24$

E) none of the above

42) $\int_1^2 \frac{2x - 3}{x^2 - 3x}\,dx$ = 42) _____

A) 0

B) $7 \ln 2$

C) e^5

D) $\frac{1}{2}(4 - 3 \ln 2)$

E) none of the above

43) $\int_1^2 \frac{x + 3}{x^2}\,dx$ = 43) _____

A) $\ln(2) + \frac{5}{2}$ B) $-\ln(2) + \frac{3}{2}$ C) $\ln(2) + \frac{3}{2}$ D) $\frac{8}{5}$ E) $-\ln(2) + \frac{5}{2}$

44) Given the marginal cost function $\frac{dc}{dq} = 2q + 50$, where c is in dollars, how much would it cost to increase production from $q = 50$ to $q = 100$? 44) _____

A) \$5000 B) \$10,000 C) \$15,000 D) \$16,000 E) \$20,000

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

45) Evaluate: $\int_0^1 \frac{x^2 + 5x + 4}{x^2 + 3x + 1}\,dx$ 45) _____

46) Evaluate: $\int_5^{11} e^3\,dx$ 46) _____

47) Suppose $f(x) = \int_5^x \frac{e^{t^2} - e^t}{e^t + \sqrt{t}}\, dt$, then find $f'(x)$ 47) _____

48) Suppose $\int_1^6 f(x)\, dx = 9$; $\int_6^4 f(x)\, dx = 4$, then find $\int_1^4 f(x)\, dx$. 48) _____

49) Evaluate $\int_{-1}^1 |x|\, dx$ 49) _____

50) Evaluate: $\int_0^2 f(x)\, dx$ where $f(x) = \begin{cases} 2x + 1 & \text{if } x \geq 1 \\ 3x & \text{if } x \leq 1 \end{cases}$ 50) _____

51) Evaluate: $\int_5^{11} \frac{e \ln x}{x}\, dx$ 51) _____