MAT 2233	Name: _____
Practice for Exam	Date: _____
Chapters 6 & 7 (V1)	Section: _____

ANSWER KEY

1. If the marginal cost function is given by $\frac{dc}{dx} = 2x - 6$ and it costs \$50 to produce 10 units, find $C(x)$, the total cost function for producing x units.

   A. $C(x) = x^2 - 6x + 10$ B. $C(x) = 2x^2 - 6x + 50$

   C. $C(x) = 2x^2 - 6x + 50$ D. $C(x) = x^2 - 6x - 10$

   ANSWER: A

2. What is the value of $\int \left(e^x + x^e\right) dx$?

   A. $(e+1)x^{e+1} + e^x + C$ B. $\frac{x^{e+1}}{e+1} + e^x + C$

   C. $e^x + \frac{x^{e+2}}{2}$ D. None of the above.

   ANSWER: B

3. Evaluate $\int \left(4e^{-2x} + x^{-1} - x^{-2}\right) dx$.

   A. $-2e^{-2x} - \frac{x^{-2}}{2} - \frac{1}{x}$ B. $-2e^{-2x} - \ln|x| + \frac{1}{x}$

   C. $-2e^{-2x} + \ln|x| + \frac{1}{x}$ D. $-\frac{4}{3}e^{-3x} + x - \frac{1}{x^3}$

   ANSWER: C

4. Evaluate $\int \left(\frac{1}{8x}\right) dx$.

   ANSWER: $\frac{1}{8}\ln|x| + C$

5. When integrating $\int \left(1 - x^3\right)^4 x^2 dx$, we would begin by letting $u =$

   A. x^3 B x^2

   C. $\left(1 - x^3\right)^2$ D. $1 - x^3$

   ANSWER: D

6. When integrating $\int \frac{x}{\sqrt{1+2x^2}}\,dx$, we would begin by letting $u =$

A. $1+2x^2$
B. x
C. $\sqrt{1+2x^2}$
D. $\frac{1}{x}$

ANSWER: A

7. $\int \frac{(\ln x)^6}{x}\,dx =$

A. $\frac{5(\ln x)^4}{x^2}+C$
B. $\frac{(\ln x)^6}{6}+C$
C. $\frac{(\ln x)^6}{6x}+C$
D. $\frac{(\ln x)^6}{6x^2}+C$

ANSWER: B

8. Evaluate $\sum_{j=0}^{3}\left(2^j-1\right) =$

A. 11
B. 23
C. 7
D. 17

ANSWER: A

9. Calculate the left-handed Riemann sum to approximate $\int_1^3 x^2\,dx$ using $n=4$, where n is the number of intervals.

A. 7.99
B. 6.75
C. 10.75
D. 5.25

ANSWER: B

10. The value of the definite integral $\int_1^2 \frac{\ln x}{x}\,dx$ could be expressed as:

A. $\frac{(\ln 2)^2}{2}$
B. $\ln 4$
C. $\ln(\ln 2-\ln 1))$
D. $(\ln 2)^2$

ANSWER: A

11. Evaluate $\int_{-5}^{4} \sqrt{4-x}\, dx$.

A. 18
B. –12
C. –18
D. 4

ANSWER: A

12. Find the integral $\int 24x(x-5)^2\, dx$, by using integration by parts.

A. $8x(x-5)^3 - 4(x-5)^2 + C$
B. $16x^2(x-5)^3 + C$
C. $8x(x-5)^3 - 2(x-5)^2 + C$
D. $16x(x-5)^3 - 4(x-5)^2 + C$

ANSWER: C

13. Find the integral $\int e^x(x+2)\, dx$, by using integration by parts.

A. $(x+2)e^{2x} - e^x + C$
B $(x+2)e^x - e^2 + C$
C. $(x+2)e^x - 2e^x + C$
D. $(x+2)^2 - 2e^x + C$

ANSWER: B

14. Find the area of the region bounded by the curve $y = \ln x$ and $y = 4x - 4$ from $x = 1$ to $x = 2$.

A. $3 - 2\ln 2$
B. $3 + 2\ln 2$
C. $2 - 2\ln 2$
D. $2 + 2\ln 2$

ANSWER: A

15. Find the area between the curves $y = x^2$ and $y = -x$.

ANSWER: $\frac{1}{6}$

16. Find the average value of the function $f(x) = \sqrt{x}$ over the interval $[1,9]$.

A. $3\frac{1}{4}$
B. $4\frac{7}{8}$
C. $2\frac{1}{2}$
D. $2\frac{1}{6}$

ANSWER: D

17. Determine the 3-unit moving average for the function $f(x) = x^2$.

A. $\frac{x^3}{9}$
B. $x^2 - 3x + 3$
C. $3x^2 - 9x + 9$
D. $\frac{x^2}{2}$

ANSWER: B

18. Five thousand dollars is deposited in an account that pays 8%, compounded continuously, for 5 years. What is the average amount of money in the account during the 5-year period.

A. $8415 B. $5361
C. $6148 D. $26,250

ANSWER: C

19. For the supply function $S(x) = 3\sqrt{x} + 2$ and the demand function $D(x) = 17 - 2\sqrt{x}$, the consumer's surplus is:

A. 495 B. 306
C. 783 D. 812

ANSWER: C

20. Evaluate $\int_{-\infty}^{1} \frac{dx}{(2x-3)^2} dx$, if it exists.

A. 1 B. ½ C. ¼ D. It does not exist.

ANSWER: B

Challenge Problems

1. Evaluate the integral $\int_{0}^{1} \frac{x^3}{\sqrt{x^2+1}} dx$.

ANSWER: $-\frac{1}{3}\sqrt{2} + \frac{2}{3}$

2. Evaluate the integral $\int x^2 \ln 4x \, dx$.

ANSWER: $\frac{2x^3 \ln 2}{3} + \frac{x^3 \ln x}{3} - \frac{x^3}{9} + C$

3. Evaluate the integral $\int \frac{\left(\sqrt{x-1} - 2\right)^3}{\sqrt{x-1}} dx$.

ANSWER: $\frac{(\sqrt{x-1} - 2)^4}{2} + C$