Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Ch 8 Practice

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Find the indefinite integral.

$$\int \frac{3}{(w-4)^7}\,dw$$

a. $-\frac{1}{2(w-4)^6}+C$
b. $\frac{3}{7(w-4)^7}+C$
c. $-\frac{1}{2(w-4)^7}+C$
d. $\frac{3}{8(w-4)^6}+C$
e. $-\frac{1}{2(w-4)^3}+C$

____ 2. Find the indefinite integral.

$$\int \frac{q^2}{q+9}\,dq$$

a. $81\ln|q+9|+\frac{q^2}{2}-9q+C$
b. $\ln|q+9|+\frac{q^2}{2}-9q+C$
c. $\ln|q+9|+\frac{q^2}{2}-10q+C$
d. $81\ln|q+9|+\frac{q^2}{2}-10q+C$
e. $81\ln|q+9|-10q+C$

____ 3. Find the indefinite integral $\int 3x^4 \cos 8\pi x^5 \, dx$.

a. $\frac{3}{40\pi} \sec 40x^4 + C$

b. $\frac{3}{40\pi} \sin 40\pi x^4 + C$

c. $\frac{3}{40\pi} \sec 120\pi x^5 + C$

d. $\frac{3}{40\pi} \tan 8\pi x^4 + C$

e. $\frac{3}{40\pi} \sin 8\pi x^5 + C$

____ 4. Find the definite integral.

$$\int_0^{12} \frac{8x}{\sqrt{x^2 + 25}} \, dx$$

a. 64
b. 56
c. 8
d. 104
e. 7

____ 5. Find the indefinite integral.

$$\int \frac{x^2}{x - 5} \, dx$$

a. $\frac{x^2}{2} + 5x + (x + 1)\ln(x - 5) + C$

b. $\frac{x^2}{3} + x + 25\ln(x - 5) + C$

c. $\frac{x^2}{2} - x - 25\ln(x + 5) + C$

d. $\frac{x^2}{3} + 5x - 25\ln(x - 5) + C$

e. $\frac{x^2}{2} + 5x + 25\ln(x - 5) + C$

____ 6. Find the indefinite integral.

$$\int x^3 e^{6x^2}\, dx$$

a. $\frac{1}{36} e^{6x^2}\left(6x^2 - 1\right) + C$

b. $-\frac{1}{72} e^{6x^2}\left(x^2 - 6\right) + C$

c. $\frac{1}{72} e^{6x^2}\left(x^2 - 6\right) + C$

d. $\frac{1}{72} e^{6x^2}\left(6x^2 - 1\right) + C$

e. $-\frac{1}{36} e^{6x^2}\left(6x^2 - 1\right) + C$

____ 7. Find the indefinite integral.

$$\int \frac{4x^2}{e^x}\, dx$$

a. $-4\left(x^2 + 2x + 2\right)e^{-x} + C$

b. $4\left(x^2 - 2x + 2\right)e^{-x} + C$

c. $-4x\left(x^2 + 2x + 2\right)e^{-x} + C$

d. $\left(x^2 + 2x + 2\right)e^{-x} + C$

e. $-\left(x^2 + 2x + 2\right)e^{-x} + C$

____ 8. Find the indefinite integral.

$$\int x^4 \ln x \, dx$$

a. $\frac{x^5}{25}\left[4\ln(x)-1\right]+C$

b. $\frac{x^4}{25}\left[\ln\left(x^4\right)-1\right]+C$

c. $\frac{x^5}{25}\left[5\ln(x)-1\right]+C$

d. $\frac{x^5}{16}\left[\ln\left(x^5\right)-1\right]+C$

e. $\frac{x^3}{25}\left[\ln\left(x^3\right)-1\right]+C$

____ 9. Find the indefinite integral.

$$\int s\sqrt{4s+3}\, ds$$

a. $\frac{(4s+3)^{3/2}(2s-1)}{20}+C$

b. $\frac{(4s+3)^{3/2}(2s-2)}{20}+C$

c. $\frac{(4s-3)^{3/2}(2s+1)}{20}+C$

d. $\frac{(4s+3)^{3/2}(2s+2)}{20}+C$

e. $\frac{(4s+3)^{3/2}(2s+1)}{20}+C$

____ 10. Find the indefinite integral.

$$\int e^{2v} \cos 7v \, dv$$

a. $\left(\frac{2\cos 7v + 7\sin 7v}{53}\right) e^{2v} + C$

b. $\left(\frac{-2\cos 7v - 7\sin 7v}{53}\right) e^{2v} + C$

c. $\left(\frac{-2\cos 7v + 7\sin 7v}{106}\right) e^{2v} + C$

d. $\left(\frac{2\cos 7v - 7\sin 7v}{106}\right) e^{2v} + C$

e. $\left(\frac{2\cos 7v - 7\sin 7v}{53}\right) e^{2v} + C$

____ 11. Evaluate $\int_0^1 e^{4x} \sin x \, dx$. Round your answer to three decimal places.

a. $\int_0^1 e^{4x} \sin x \, dx \approx 3.397$

b. $\int_0^1 e^{4x} \sin x \, dx \approx 12.604$

c. $\int_0^1 e^{4x} \sin x \, dx \approx 9.134$

d. $\int_0^1 e^{4x} \sin x \, dx \approx 43.054$

e. $\int_0^1 e^{4x} \sin x \, dx \approx 31.254$

____ 12. Suppose a damping force affects the vibration of a spring so that the displacement of the string is given by $y = e^{-8t}(\cos 2t + 9\sin 2t)$. Find the average value of y on the interval from $t = 0$ to $t = \pi$. Round your answer to three decimal places.

a. 0.406
b. 0.131
c. 0.122
d. 0.129
e. 0.382

____ 13. Find the indefinite integral.

$$\int \cos x \sin^3 x dx$$

a. $\frac{\cos^3 x}{3} + C$
b. $\frac{\sin^4 x}{4} + C$
c. $\frac{\sin^3 x}{3} + C$
d. $-\frac{\sin^4 x}{4} + C$
e. $-\frac{\cos^4 x}{4} + C$

____ 14. Find the indefinite integral.

$$\int \sin^3 2x \cos^4 2x dx$$

a. $-\frac{1}{70}\left(7 - 5\cos^2 2x\right)\cos^5 2x + C$
b. $\frac{1}{2}\left(7 - 5\cos^2 2x\right)\cos^5 2x + C$
c. $-\frac{1}{60}\left(7 - 5\cos^2 2x\right)\cos^5 2x + C$
d. $-\frac{1}{2}\left(7 - 5\cos^2 2x\right)\cos^5 2x + C$
e. $-\frac{1}{70}\left(7 - 5\cos^2 2x\right)\cos^5 2x + C$

____ 15. Find the indefinite integral.

$$\int \sin^3 \frac{x}{8}\, dx$$

a. $\dfrac{8\left(1+\cos^2 \frac{x}{8}\right)\cos \frac{x}{8}}{3}+C$

b. $-\dfrac{8\left(3-\cos^2 \frac{x}{8}\right)\cos \frac{x}{8}}{3}+C$

c. $\dfrac{8\left(2-\cos^2 \frac{x}{8}\right)\cos \frac{x}{8}}{3}+C$

d. $\dfrac{8\left(3-\cos^2 \frac{x}{8}\right)\cos \frac{x}{8}}{3}+C$

e. $-\dfrac{8\left(2-\cos^2 \frac{x}{8}\right)\cos \frac{x}{8}}{3}+C$

____ 16. Find the indefinite integral.

$$\int \sin^2 3x dx$$

a. $\dfrac{3x-\sin 3x\cos 3x}{3}+C$

b. $\dfrac{3x+\sin 3x\cos 3x}{6}+C$

c. $\dfrac{3x-\sin 3x\cos 3x}{6}+C$

d. $\dfrac{3x-\sin^2 3x\cos 3x}{6}+C$

e. $\dfrac{3x+\sin 3x\cos 3x}{3}+C$

____ 17. Write the form of the partial fraction decomposition for the following rational expression.

$$\frac{7x-6}{x\left(x^2+10\right)^2}$$

a. $\frac{A}{x}+\frac{Bx+C}{\left(x^2+10\right)^2}$

b. $\frac{A}{x}+\frac{B}{x^2+10}+\frac{C}{\left(x^2+10\right)^2}$

c. $\frac{A}{x}+\frac{B}{x+10}+\frac{C}{x-10}$

d. $\frac{A}{x}+\frac{B}{x+10}+\frac{C}{(x+10)^2}+\frac{D}{x-10}+\frac{E}{(x-10)^2}$

e. $\frac{A}{x}+\frac{Bx+C}{x^2+10}+\frac{Dx+E}{\left(x^2+10\right)^2}$

____ 18. Use partial fractions to find $\int \frac{1}{x^2-9}\,dx$.

a. $\int \frac{1}{x^2-9}\,dx=\frac{1}{6}\ln\left|\frac{x-3}{x+3}\right|+C$

b. $\int \frac{1}{x^2-9}\,dx=\frac{1}{6(x-3)}-\frac{1}{6(x+3)}+C$

c. $\int \frac{1}{x^2-9}\,dx=\frac{1}{6}\ln\left|\frac{x-6}{x+6}\right|+C$

d. $\int \frac{1}{x^2-9}\,dx=\frac{1}{(x-3)}-\frac{1}{(x+3)}+C$

e. $\int \frac{1}{x^2-9}\,dx=\ln\left|\frac{x-3}{x+3}\right|+C$

____ 19. Use partial fractions to find $\int \frac{6x^2 + 14x - 3}{x^3 + 3x^2}\,dx$.

a. $\int \frac{6x^2 + 14x - 3}{x^2(x+3)}\,dx = \ln\left|x^6 + 3x^5\right| + C$

b. $\int \frac{6x^2 + 14x - 3}{x^2(x+3)}\,dx = \frac{1}{x} + \left(x^6 + 3x^5\right) + C$

c. $\int \frac{6x^2 + 14x - 3}{x^2(x+3)}\,dx = \frac{1}{x} + \ln\left|x^7 + x^5\right| + C$

d. $\int \frac{6x^2 + 14x - 3}{x^2(x+3)}\,dx = \ln\left|x^6 + 5x^4\right| + C$

e. $\int \frac{6x^2 + 14x - 3}{x^2(x+3)}\,dx = \frac{1}{x} + \ln\left|x^6 + 3x^5\right| + C$

____ 20. Evaluate the definite integral $\int_0^2 \frac{3}{4x^2+5x+1}\,dx$.

a. $\int_0^2 \frac{3}{4x^2+5x+1}\,dx = 5$

b. $\int_0^2 \frac{3}{4x^2+5x+1}\,dx = \ln(3)$

c. $\int_0^2 \frac{3}{4x^2+5x+1}\,dx = 2$

d. $\int_0^2 \frac{3}{4x^2+5x+1}\,dx = \ln(4)$

e. $\int_0^2 \frac{3}{4x^2+5x+1}\,dx = \ln(1)$

____ 21. Determine whether the improper integral $\int_9^{11} \frac{2}{(x-10)^2}\,dx$ diverges or converges. Evaluate the integral if it converges.

a. 100
b. 2
c. $\frac{1}{50}$
d. $\frac{22}{9}$
e. diverges

____ 22. Determine whether the improper integral $\int_4^\infty \frac{2}{x^3}\,dx$ diverges or converges. Evaluate the integral if it converges.

a. $\frac{1}{2}$
b. $\frac{1}{16}$
c. 2
d. $\frac{1}{32}$
e. diverges

____ 23. Determine whether the improper integral $\int_0^\infty xe^{-x/3}\,dx$ diverges or converges. Evaluate the integral if it converges.

a. 9
b. $e^{-1/3}$
c. $-\frac{1}{3}$
d. 3
e. diverges

____ 24. Determine whether the improper integral $\int_0^\infty \frac{e^{2x}}{1+e^{4x}}\,dx$ diverges or converges. Evaluate the integral if it converges.

a. diverges
b. converges

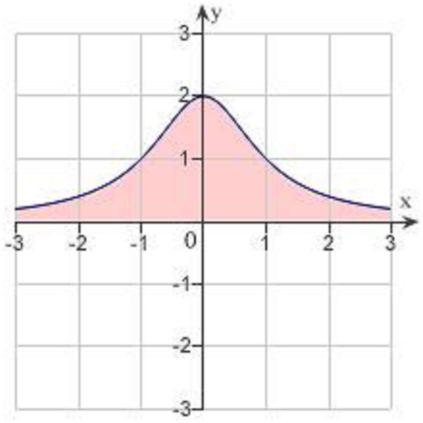
____ 25. Determine whether the improper integral $\int_0^1 \frac{3}{x}\,dx$ diverges or converges.

a. diverges
b. converges

____ 26. Determine whether the improper integral $\int_0^\infty \frac{10}{\sqrt{x}\,(x+81)}\,dx$ diverges or converges. Evaluate the integral if it converges.

a. $\frac{10}{81}\pi$
b. $\frac{10}{9}\pi$
c. diverges
d. $\frac{10}{81}$
e. $\frac{10}{9}$

____ 27. Find the area between the x-axis and the graph of the function $y = \frac{2}{x^2+1}$.



a. 2π
b. 2
c. 3
d. 3π
e. 0

Ch 8 Practice
Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 1 DIF: Medium REF: Section 8.1
   OBJ: Evaluate the indefinite integral of a function using substitution
   MSC: Skill
2. ANS: A PTS: 1 DIF: Medium REF: Section 8.1
   OBJ: Evaluate the indefinite integral of an improper fraction MSC: Skill
3. ANS: E PTS: 1 DIF: Easy REF: Section 8.1
   OBJ: Evaluate the indefinite integral of a function using substitution
   MSC: Skill
4. ANS: A PTS: 1 DIF: Medium REF: Section 8.1
   OBJ: Evaluate a definite integral using substitution MSC: Skill
5. ANS: E PTS: 1 DIF: Medium REF: Section 8.1
   OBJ: Evaluate the indefinite integral of an improper fraction MSC: Skill
6. ANS: D PTS: 1 DIF: Medium REF: Section 8.2
   OBJ: Evaluate the indefinite integral of a function using integration by parts
   MSC: Skill
7. ANS: A PTS: 1 DIF: Medium REF: Section 8.2
   OBJ: Evaluate the indefinite integral of a function using integration by parts
   MSC: Skill
8. ANS: C PTS: 1 DIF: Medium REF: Section 8.2
   OBJ: Evaluate the indefinite integral of a function using integration by parts
   MSC: Skill
9. ANS: A PTS: 1 DIF: Medium REF: Section 8.2
   OBJ: Evaluate the indefinite integral of a function using substitution
   MSC: Skill
10. ANS: A PTS: 1 DIF: Medium REF: Section 8.2
    OBJ: Evaluate the indefinite integral of a function using integration by parts
    MSC: Skill
11. ANS: C PTS: 1 DIF: Medium REF: Section 8.2
    OBJ: Evaluate the definite integral of a function using integration by parts
    MSC: Skill
12. ANS: C PTS: 1 DIF: Medium REF: Section 8.2
    OBJ: Calculate the average value of a function in applications MSC: Application
13. ANS: B PTS: 1 DIF: Easy REF: Section 8.3
    OBJ: Evaluate an indefinite integral involving powers of sines and cosines
    MSC: Skill
14. ANS: E PTS: 1 DIF: Medium REF: Section 8.3
    OBJ: Evaluate an indefinite integral involving powers of sines and cosines
    MSC: Skill
15. ANS: B PTS: 1 DIF: Medium REF: Section 8.3
    OBJ: Evaluate an indefinite integral involving powers of sines and cosines
    MSC: Skill

16. ANS: C PTS: 1 DIF: Medium REF: Section 8.3
OBJ: Evaluate an indefinite integral involving powers of sines and cosines
MSC: Skill
17. ANS: E PTS: 1 DIF: Medium REF: Section 8.5
OBJ: Write the form of the partial fraction decomposition for a given rational expression
MSC: Skill
18. ANS: A PTS: 1 DIF: Easy REF: Section 8.5
OBJ: Evaluate the indefinite integral of a function using partial fractions with linear factors
MSC: Skill
19. ANS: E PTS: 1 DIF: Medium REF: Section 8.5
OBJ: Evaluate the indefinite integral of a function using partial fractions with linear factors
MSC: Skill
20. ANS: B PTS: 1 DIF: Medium REF: Section 8.5
OBJ: Evaluate the definite integral of a function using partial fractions with linear factors
MSC: Skill
21. ANS: E PTS: 1 DIF: Easy REF: Section 8.8
OBJ: Evaluate an improper integral if it converges MSC: Skill
22. ANS: B PTS: 1 DIF: Easy REF: Section 8.8
OBJ: Evaluate an improper integral if it converges MSC: Skill
23. ANS: A PTS: 1 DIF: Medium REF: Section 8.8
OBJ: Evaluate an improper integral if it converges MSC: Skill
24. ANS: B PTS: 1 DIF: Medium REF: Section 8.8
OBJ: Test an improper integral for convergence MSC: Skill
25. ANS: A PTS: 1 DIF: Easy REF: Section 8.8
OBJ: Test an improper integral for convergence MSC: Skill
26. ANS: B PTS: 1 DIF: Difficult REF: Section 8.8
OBJ: Evaluate an improper integral if it converges MSC: Skill
27. ANS: A PTS: 1 DIF: Medium REF: Section 8.8
OBJ: Calculate the area bounded by a function MSC: Application