



Integration Techniques

SCORE

___ / 20

Chapter: Integral Calculus • Level ★★★ • Time: 30 min

Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Use u-substitution for composite integrands.
- ✓ Use integration by parts: $\int u \, dv = uv - \int v \, du$.
- ✓ Recognise which technique fits a given integral.
- ✓ Apply both techniques to standard forms.



Section A • Concept Check

• BEGINNER

$4 \times 1 = 4$

1 $\int 2x(x^2 + 3)^4 \, dx$ (let $u = x^2 + 3$) = ?

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

3 $\int x \sin x \, dx = ?$

- ☐ A. $-x \cos x + \sin x + C$
☐ B. $x \cos x + C$
☐ C. $-\cos x + C$
☐ D. $x \sin x + C$

2 Integration by parts: $\int u \, dv = ?$

- ☐ A. $uv - \int v \, du$
☐ B. $uv + \int v \, du$
☐ C. uv
☐ D. $\int v \, du - uv$

4 $\int \ln x \, dx$ ($u = \ln x$, $dv = dx$) = ?

- ☐ A. $x \ln x - x + C$
☐ B. $1/x + C$
☐ C. $x \ln x + C$
☐ D. $\ln x - x$



Section B • Problem Solving

• INTERMEDIATE

$2 + 3 \times 3 = 11$

5 Integration by parts: $\int u \, dv =$ _____

6 For $\int 2x(x^2 + 3)^4 \, dx$, substitute $u =$ _____

7 Integrate $\int 2x(x^2 + 3)^4 \, dx$ using substitution.

8 Integrate $\int x \sin x \, dx$ using integration by parts.

9 Integrate $\int 5x^4(x^5 - 2)^2 \, dx$ using substitution.



Section C • Challenge

• CHALLENGE

5

10 Integrate $\int \ln x \, dx$ using integration by parts.

Reflection — the most useful thing I learned: _____

A ___/4 B ___/11 C ___/5 Total ___/20

Teacher's Signature _____

Parent's Signature _____

✂ ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1-A 2-A 3-A 4-A | 5 $uv - \int v \, du$ 6 $x^2 + 3$ 7 $= (x^2 + 3)^5 / 5 + C$ 8 $= -x \cos x + \sin x + C$
 9 $= (x^5 - 2)^3 / 3 + C$ | 10 $= x \ln x - x + C$

