Integration by Parts Quiz

A general method of integration is integration by parts. The pattern is given by:

$$\int u\,dv = uv - \int v\,du$$

MULTIPLE CHOICE
Identify the letter of the choice that best completes the statement, or answers the question:

1. If the integrand involves a logarithm, an inverse trigonometric function, or a tough function to integrate whose derivative is easily calculated, that function should be:

- **A** the dv in $\int u\,dv$
- **B** the u in $\int u\,dv$

2. If the integrand involves a polynomial multiplied by a sine or a cosine, an exponential function, or some easily-integrated function, the polynomial should be:

- **A** the dv in $\int u\,dv$
- **B** the u in $\int u\,dv$

3. Integration by parts is called that because

- **A** it is the inverse of the Product Rule for differentiation
- **B** the integrand is split into parts
- **C** the technique only performs a part of the original integration
- **D** it is the inverse of the Chain Rule for differentiation

4. Complete: $\int x \sin x \, dx = \sin x -$ _____ + c, where c is a constant

- **A** x cos x
- **B** $\sin^2 x$
- **C** x
- **D** none of the above

5. Complete: $\int x \cos x \, dx = \cos x +$ _____ + c, where c is a constant

- **A** sin x
- **B** x sin x
- **C** x
- **D** none of the above

6. Complete: $\int x \cos 2x \, dx = \frac{x}{2} \sin 2x +$ _____ + c, where c is a constant

- **A** cos 2x
- **B** 2 cos x
- **C** $\frac{1}{4}\cos 2x$
- **D** none of the above

Authored by Gordon Wong

7. Complete: $\int x^2 \cos x \, dx =$ ______ + 2x cos x − 2 sin x + c, where c is a constant

A $x^2 \cos x$

B $\sin^2 x$

C $x^2 \sin x$

D none of the above

8. Complete: $\int x^2 \ln x \, dx =$ ______ $- \frac{x^3}{9}$ + c, where c is a constant

A $\frac{x^3}{3} \ln x$

B ln x

C $\frac{1}{x}$

D none of the above

9. Complete: $\int \ln x \, dx =$ ______ − x + c, where c is a constant

A x

B x ln x

C ln x

D none of the above

10. Complete: $\int x^3 e^x \, dx$ = (________) · e^x + c, where c is a constant

A x^3

B $x^3 + 3x^2 - 6x + 6$

C $x^3 - 3x^2 + 6x - 6$

D none of the above

Bonus:

11. Complete: $\int \cos^2 x \, dx$ = ______ + $\frac{x}{2}$ + c, where c is a constant

A x^2

B $\frac{\cos x \sin x}{2}$

C $\sin^2 x$

D none of the above

SOLUTIONS

1. B	2. A	3. C	4. A	5. B
6. C	7. C	8. A	9. B	10. C
11. B				