

Name : \_\_\_\_\_

Score : \_\_\_\_\_

Teacher : \_\_\_\_\_

Date : \_\_\_\_\_

## Integration by Parts

Find each indefinite integral using the substitution provided.

1)  $\int e^x \sin(x) dx$

$$u = \sin(x); dv = e^x dx$$

2)  $\int x \cdot 4^x dx$

$$u = x; dv = 4^x dx$$

3)  $\int x^2 \cos(4x) dx$

$$u = x^2; dv = \cos(4x) dx$$

4)  $\int x^2 e^{4x} dx$

$$u = x^2; dv = e^{4x} dx$$

5)  $\int x^5 \sqrt{x^3 + 4} dx$

$$u = x^3; dv = x^2 \sqrt{x^3 + 4} dx$$

6)  $\int x \sqrt{x + 5} dx$

$$u = x; dv = \sqrt{x + 5} dx$$

7)  $\int \frac{\ln(x)}{x} dx$

$$u = \ln(x); dv = \frac{1}{x^2} dx$$

8)  $\int e^{-x} \cos(2x) dx$

$$u = e^{-x}; dv = \cos(2x) dx$$



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## Integration by Parts

Find each indefinite integral using the substitution provided.

1)  $\int e^x \sin(x) dx$

$$u = \sin(x); dv = e^x dx$$

$$\frac{1}{2} e^x (\sin(x) - \cos(x)) + C$$

2)  $\int x \cdot 4^x dx$

$$u = x; dv = 4^x dx$$

$$\frac{4^x (x \ln(4) - 1)}{(\ln(4))^2} + C$$

3)  $\int x^2 \cos(4x) dx$

$$u = x^2; dv = \cos(4x) dx$$

$$\frac{x^2 \sin(4x)}{4} + \frac{2x \cos(4x)}{16} - \frac{2 \sin(4x)}{64} + C$$

4)  $\int x^2 e^{4x} dx$

$$u = x^2; dv = e^{4x} dx$$

$$\frac{x^2 e^{4x}}{4} - \frac{2x e^{4x}}{16} + \frac{2e^{4x}}{64} + C$$

5)  $\int x^5 \sqrt{x^3 + 4} dx$

$$u = x^3; dv = x^2 \sqrt{x^3 + 4} dx$$

$$\frac{2}{45} (x^3 + 4)^{\frac{3}{2}} (3x^3 - 8) + C$$

6)  $\int x \sqrt{x + 5} dx$

$$u = x; dv = \sqrt{x + 5} dx$$

$$\frac{2}{15} (x + 5)^{\frac{3}{2}} (3x - 10) + C$$

7)  $\int \frac{\ln(x)}{x} dx$

$$u = \ln(x); dv = \frac{1}{x^2} dx$$

$$\frac{\ln^2(x)}{2} + C$$

8)  $\int e^{-x} \cos(2x) dx$

$$u = e^{-x}; dv = \cos(2x) dx$$

$$\frac{2 \sin(2x) - \cos(2x)}{5e^x} + C$$

