

Name : _____

Score : _____

Teacher : _____

Date : _____

Integration by Parts

Find each indefinite integral using the substitution provided.

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

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

2) $\int x e^x \, dx$

$u = x; dv = e^x \, dx$

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

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

4) $\int x^2 \sin(10x) \, dx$

$u = x^2; dv = \sin(10x) \, dx$

5) $\int e^x \sin(x) \, dx$

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

6) $\int x^2 \cos(3x) \, dx$

$u = x^2; dv = \cos(3x) \, dx$

7) $\int (6x + 3) \cos\left(\frac{x}{5}\right) \, dx$

$u = 6x + 3; dv = \cos\left(\frac{x}{5}\right) \, dx$

8) $\int x \cos(x) \, dx$

$u = x; dv = \cos(x) \, dx$



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Integration by Parts

Find each indefinite integral using the substitution provided.

$$1) \int x^5 \sqrt{x^3 + 4} \, dx$$

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

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

$$2) \int x e^x \, dx$$

$$u = x; \, dv = e^x \, dx$$

$$e^x(x - 1) + C$$

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

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

$$\frac{x^2 e^{2x}}{2} - \frac{2x e^{2x}}{4} + \frac{2e^{2x}}{8} + C$$

$$4) \int x^2 \sin(10x) \, dx$$

$$u = x^2; \, dv = \sin(10x) \, dx$$

$$\frac{-x^2 \cos(10x)}{10} + \frac{x \sin(10x)}{50} + \frac{\cos(10x)}{500} + C$$

$$5) \int e^x \sin(x) \, dx$$

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

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

$$6) \int x^2 \cos(3x) \, dx$$

$$u = x^2; \, dv = \cos(3x) \, dx$$

$$\frac{x^2 \sin(3x)}{3} + \frac{2x \cos(3x)}{9} - \frac{2 \sin(3x)}{27} + C$$

$$7) \int (6x + 3) \cos\left(\frac{x}{5}\right) \, dx$$

$$u = 6x + 3; \, dv = \cos\left(\frac{x}{5}\right) \, dx$$

$$(30x + 15) \sin\left(\frac{x}{5}\right) + 150 \cos\left(\frac{x}{5}\right) + C$$

$$8) \int x \cos(x) \, dx$$

$$u = x; \, dv = \cos(x) \, dx$$

$$x \sin(x) + \cos(x) + C$$

