Calculus Worksheet #3 Unit 10 Selected Solutions

Use the pattern $\int e^u du = e^u + C$ to integrate each of the following.

1. $\int e^{2x} dx =$

$= \frac{1}{2}\int e^{2x}(2dx) =$

$= \frac{1}{2} e^{2x} + C$

3. $\int x e^{x^2} dx =$

$= \frac{1}{2}\int e^{x^2}(2x dx) =$

$= \frac{1}{2} e^{x^2} + C$

8. $\int_0^4 e^{0.5x} dx =$

$= 2\int_0^4 e^{0.5x}(0.5dx) =$

$= \frac{1}{2} e^{0.5x}\Big|_0^4 = \frac{1}{2}(e^2 - e^0) =$

$= \frac{1}{2}(e^2 - 1)$

Use the pattern $\int \frac{du}{u} = \ln|u| + C$ to integrate each of the following.

9. $\int \frac{dx}{2x+3} =$

$= \frac{1}{2}\int \frac{2dx}{2x+3} =$

$= \frac{1}{2}\ln|2x+3| + C$

12. $\int \frac{x^2 dx}{x^3 - 1} =$

$= \frac{1}{3}\int \frac{3x^2 dx}{x^3 - 1} =$

$= \frac{1}{3}\ln|x^3 - 1| + C$

16. $\int_1^3 \frac{x dx}{x^2 + 3} =$

$= \frac{1}{2}\int_1^3 \frac{2x dx}{x^2 + 3} = \frac{1}{2}\ln|x^2 + 3|\Big|_1^3 =$

$= \frac{1}{2}[\ln(12) - \ln(4)] = \frac{1}{2}\ln(3)$