

Problems for Gateway #3: Integrals Involving Sine and Cosine

Note: The phrase “most general antiderivative” is included to remind you to include a “+C” when calculating an antiderivative. If you leave out the “+C” on the actual gateway test, your answer will be marked wrong.

1. Calculate the most general antiderivative of: $3 \cdot \cos(x) \cdot (1 + \sin(x))^4$.
2. Calculate the most general antiderivative of: $-2 \cdot \sin(x) \cdot (10 + \cos(x))^{1/2}$.
3. Calculate the most general antiderivative of: $4x \cdot \cos(1 + x^2)$.
4. Calculate the most general antiderivative of: $\cos(x) \cdot (1 + \sin(x))^{10}$.
5. Calculate the most general antiderivative of: $\frac{\cos(x)}{1 + \sin(x)}$.
6. Calculate the most general antiderivative of: $\cos(x) \cdot e^{\sin(x)}$.
7. Calculate the most general antiderivative of: $\frac{\cos(x)}{\sin(x)}$.
8. Calculate the most general antiderivative of: $3x^2 \cdot \sin(x^3)$.
9. Calculate the most general antiderivative of: $-\sin(x) \cdot (7 + \cos(x))^{19}$.
10. Calculate the most general antiderivative of: $\frac{-\sin(x)}{\sqrt{1 + \cos(x)}}$.

Answers:

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| 1. | $\frac{3}{5} \cdot (1 + \sin(x))^5 + C.$ | 2. | $\frac{4}{3} \cdot (10 + \cos(x))^{3/2} + C.$ |
| 3. | $2 \cdot \sin(1 + x^2) + C.$ | 4. | $\frac{1}{11} \cdot (1 + \sin(x))^{11} + C.$ |
| 5. | $\ln(1 + \sin(x)) + C.$ | 6. | $e^{\sin(x)} + C.$ |
| 7. | $\ln(\sin(x)) + C.$ | 8. | $-\cos(x^3) + C.$ |
| 9. | $\frac{1}{20} \cdot (7 + \cos(x))^{20} + C.$ | 10. | $2 \cdot \sqrt{1 + \cos(x)} + C.$ |