

Quiz #5

Please print your name:

Problem 1. (6 points) Evaluate the following indefinite integrals.

(a) $\int \cos(3x) \, dx =$

(b) $\int \frac{dx}{3\sqrt{x}} =$

(c) $\int \frac{dx}{3x+1} =$

Solution.

(a) $\int \cos(3x) \, dx = \frac{1}{3}\sin(3x) + C$

(b) $\int \frac{dx}{3\sqrt{x}} = \frac{1}{3} \int x^{-1/2} dx = \frac{2}{3}x^{1/2} + C$, which we can, of course, also write as $\frac{2}{3}\sqrt{x} + C$.

(c) $\int \frac{dx}{3x+1} = \frac{1}{3}\ln|3x+1| + C$

Problem 2. (4 points) Evaluate the following indefinite integral: $\int x \sin(3x) dx$

Solution. We choose $f(x) = x$ and $g'(x) = \sin(3x)$, so that $g(x) = -\frac{1}{3}\cos(3x)$, to get

$$\int x \sin(3x) \, dx = -\frac{1}{3}x \cos(3x) + \frac{1}{3} \int \cos(3x) \, dx = -\frac{1}{3}x \cos(3x) + \frac{1}{9}\sin(3x) + C.$$