

# Quiz #5

Please print your name:

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

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

(b)  $\int \sin(4x) dx =$

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

**Solution.**

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

(b)  $\int \sin(4x) dx = -\frac{1}{4} \cos(4x) + C$

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

**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

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