THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MATH1510 Calculus for Engineers
Integrals allowed in exams without justification

The following formulas will not be provided in exams.

In the following formulas, C stands for an arbitrary constant.

$$\int x^k\,dx = \frac{1}{k+1}x^{k+1} + C \quad \text{if } k \neq -1$$

$$\int x^{-1}\,dx = \ln|x| + C$$

$$\int e^x\,dx = e^x + C$$

$$\int a^x\,dx = \frac{1}{\ln a}a^x + C$$

$$\int \frac{1}{\sqrt{a^2 - x^2}}\,dx = \arcsin\left(\frac{x}{a}\right) + C$$

$$\int \frac{1}{a^2 + x^2}\,dx = \frac{1}{a}\arctan\left(\frac{x}{a}\right) + C$$

$$\int \cos x\,dx = \sin x + C$$

$$\int \sin x\,dx = -\cos x + C$$

$$\int \sec^2 x\,dx = \tan x + C$$

$$\int \sec x\tan x\,dx = \sec x + C$$

$$\int \csc x\cot x\,dx = -\csc x + C$$

$$\int \csc^2 x\,dx = -\cot x + C$$

$$\int \tan x\,dx = \ln|\sec x| + C$$

$$\int \sec x\,dx = \ln|\sec x + \tan x| + C$$

$$\int \csc x\,dx = -\ln|\csc x + \cot x| + C$$

$$\int \cot x\,dx = -\ln|\csc x| + C$$

where $a \in \mathbb{R}$ such that $a > 0$.

For any $a, b \in \mathbb{R}$ such that $a \neq 0$,

$$\int f(ax+b)\,dx = \frac{1}{a}F(ax+b) + C$$

where $F'(x) = f(x)$.