Answer on Question #52766 – Math – Integral Calculus

Using the Table of Integrals solve the following integrals:

(Make sure to state which equation you use)

a) ∫1/(25+x^2) dx

Solution

$$\int \frac{1}{25+x^2}\,dx = \frac{1}{5}\arctan\frac{x}{5} + c\,,$$

where c is an arbitrary real constant.

We used the following formula $\int \frac{1}{a^2+x^2}\,dx = \frac{1}{a}arctan\frac{x}{a} + c,$

where c is an arbitrary real constant.

b) ∫x/((x+3)^2) dx

Solution

$$\int \frac{x}{(x+3)^2}\,dx = \int \frac{(x+3)-3}{(x+3)^2}dx = \int \frac{(x+3)}{(x+3)^2}dx - \int \frac{3}{(x+3)^2}\,dx = \int \frac{(x+3)d(x+3)}{(x+3)^2} - 3\int \frac{d(x+3)}{(x+3)^2} =$$

$$= |\, x+3=t \,| = \int \frac{tdt}{t^2} - 3\int \frac{dt}{t^2} = \int \frac{dt}{t} + 3\int\left(-\frac{1}{t^2}\right)dt = \ln|t| + \frac{3}{t} + C = \ln|x+3| + \frac{3}{x+3} + C\,,$$

where C is an arbitrary real constant.

We used the following formulae:

$$\int \frac{dt}{t} = \ln|t| + C\,,$$

$$\int t^n dt = \frac{t^{n+1}}{n+1} + C\,, n \neq -1,$$

where C is an arbitrary real constant.