Funzioni trigonometriche Esercizi #1

(Integrali indefiniti elementari) Calcolo integrale

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Donazione

Se apprezzi le mie slide, considera di fare una donazione per supportare il mio lavoro.

Grazie!

Esercizi

Calcolare

1. $\int \sin(5x+1)\,dx = \left[-\frac{1}{5}\cos(5x+1)+C\right]$
2. $\int \cos(5x+1)\,dx = \left[\frac{1}{5}\sin(5x+1)+C\right]$
3. $\int \cos(1-2x)\,dx = \left[\frac{1}{2}\sin(2x-1)+C\right]$
4. $\int (x+1)\sin(2x^2+4x)\,dx = \left[-\frac{1}{4}\cos(2x^2+4x)+C\right]$
5. $\int x^3 \cos x^4\,dx = \left[\frac{1}{4}\sin x^4+C\right]$
6. $\int \sin(1+x)\,dx = \left[-\cos(1+x)+C\right]$
7. $\int \cos(\pi+x)\,dx = \left[-\sin x+C\right]$
8. $\int 4x \sin x^2\,dx = \left[-2\cos x^2+C\right]$
9. $\int \frac{1}{x^2}\sin\left(\frac{1}{x}\right)dx = \left[\cos\left(\frac{1}{x}\right)+C\right]$

Se vi piace iscrivetevi al canale, mettete un mi piace o lasciate un commento

Soluzione

Esercizio 1

Calcolare $I = \int \sin(5x+1)\,dx$

Soluzione

$$
\begin{aligned}
I &= \begin{pmatrix} u = 5x+1 \\ du = 5\,dx \end{pmatrix} = \frac{1}{5}\int \sin u\,du \\
&= -\frac{1}{5}\cos u \\
&= (\,u = 5x+1\,) = -\frac{1}{5}\cos(5x+1) + C
\end{aligned}
$$

Esercizio 2

Calcolare $I = \int \cos(5x+1)\,dx$

Soluzione

$$
\begin{aligned}
I &= \begin{pmatrix} u = 5x+1 \\ du = 5\,dx \end{pmatrix} = \frac{1}{5}\int \cos u\,du \\
&= \frac{1}{5}\sin u \\
&= (\,u = 5x+1\,) = \frac{1}{5}\sin(5x+1) + C
\end{aligned}
$$

Esercizio 3

Calcolare $I = \int \cos(1 - 2x)\, dx$

Soluzione

$$
\begin{aligned}
I &= \begin{pmatrix} u = 1 - 2x \\ du = -2\, dx \end{pmatrix} = -\frac{1}{2} \int \cos u \, du \\
&= -\frac{1}{2} \sin u \\
&= (\, u = 1 - 2x \,) = -\frac{1}{2} \sin(1 - 2x) = \frac{1}{2} \sin(2x - 1) + C
\end{aligned}
$$

Esercizio 4

Calcolare $I = \int (x+1)\sin(2x^2+4x)\,dx$

Soluzione

$$
\begin{aligned}
I &= \begin{pmatrix} u = 2x^2+4x \\ du = 4(x+1)\,dx \end{pmatrix} = \frac{1}{4}\int \sin u\,du \\
&= -\frac{1}{4}\cos u \\
&= (\,u = 2x^2+4x\,) = -\frac{1}{4}\cos(2x^2+4x) + C
\end{aligned}
$$

Esercizio 5

Calcolare $I = \int x^3 \cos x^4 \, dx$

Soluzione

$$
\begin{aligned}
I &= \begin{pmatrix} u = x^4 \\ du = 4x^3 \, dx \end{pmatrix} = \frac{1}{4} \int \cos u \, du \\
&= \frac{1}{4} \sin u \\
&= (\, u = x^4 \,) = \frac{1}{4} \sin x^4 + C
\end{aligned}
$$

Esercizio 6

Calcolare $I = \int \sin(1+x)\,dx$

Soluzione

$$
\begin{aligned}
I &= \begin{pmatrix} u = 1+x \\ du = dx \end{pmatrix} = \int \sin u\,du \\
&= -\cos u \\
&= (\,u = 1+x\,) = -\cos(1+x) + C
\end{aligned}
$$

Esercizio 7

> Calcolare $I = \int \cos(\pi + x)\, dx$

Soluzione

$$I = \begin{pmatrix} u = \pi + x \\ du = dx \end{pmatrix} = \int \cos u\, du = \sin u$$
$$= (\, u = \pi + x \,) = \sin(\pi + x) = -\sin x + C$$

oppure

$$I = (\, \cos(\pi + x) = -\cos(x) \,) = -\int \cos(x)\, dx = -\sin x + C$$

Esercizio 8

Calcolare $I = \int 4x \sin x^2 \, dx$

Soluzione

$$
\begin{aligned}
I &= \begin{pmatrix} u = x^2 \\ du = 2x \, dx \end{pmatrix} = 2 \int \sin u \, du \\
&= -2 \cos u \\
&= (\, u = x^2 \,) = -2 \cos x^2 + C
\end{aligned}
$$

Esercizio 9

Calcolare $I = \int \frac{1}{x^2} \sin\left(\frac{1}{x}\right) dx$

Soluzione

$$
\begin{aligned}
I &= \begin{pmatrix} u = \frac{1}{x} \\ du = -\frac{1}{x^2}\, dx \end{pmatrix} = -\int \sin u \, du \\
&= \cos u \\
&= \left(u = \tfrac{1}{x}\right) = \cos\left(\frac{1}{x}\right) + C
\end{aligned}
$$