

Kalkulus Integral

Integral Trigonometri Khusus

Metode Substitusi

- Teorema
- $\int f(g(x))g'(x)dx = \int f(g(x))d(g(x)) = F(g(x)) + c$
- Contoh 1.
- $\int 2x(7x^2 - 77)dx = \int 7(x^2 - 11)d((x^2 - 11)) = \frac{7}{2}(x^2 - 11)^2 + c$
- Contoh 2.
- $\int 5x \cos x^2 dx = \int \frac{5}{2} \cos(x^2) d((x^2)) = \frac{5}{2} \sin(x^2) + c$

Integral Fungsi Trigonometri

- Jenis 1 $\int \cos^n x dx$, $\int \sin^n x dx$
-
- Untuk n ganjil
- $\int \cos^5 x dx = \int \cos^4 x \cos x dx = \int (1 - \sin^2 x)^2 \cos x dx$
- $= \dots$
- Untuk n genap
- $\int \cos^4 x dx = \int \left(\frac{1 + \cos 2x}{2} \right)^2 dx = \dots$
- $= \dots$

Integral Fungsi Trigonometri

- Jenis 2 $\int \cos^n x \sin^m x dx$
-
- Untuk m atau n positif ganjil
- $\int \cos^{-2} x \cos^5 x dx = \int \cos^4 x \cos x \cos^{-2} x dx$
- $= \int (1 - \sin^2 x)^2 \cos x \cos^{-2} x dx$
- $= \dots$
- Untuk m atau n genap
- $\int \cos^4 x \sin^2 x dx = \int \left(\frac{1 + \cos 2x}{2} \right)^2 \left(\frac{1 - \cos 2x}{2} \right) dx = \dots$
- $= \dots$

Integral Fungsi Trigonometri

- Jenis 3 $\int \cot^m x dx, \int \tan^m x dx$
- $\int \cot^5 x dx = \int (\operatorname{cosec}^2 x - 1)^2 \cot x dx$
- $= \dots$
- $\int \tan^4 x dx = \int (\sec^2 x - 1)^2 dx$
- $= \dots$

Integral Fungsi Trigonometri

- Jenis 4 $\int \tan^m x \sec^n x dx, \int \cot^m x \operatorname{cosec}^n x dx$
- Untuk n genap, m sembarang
- $\int \tan^{-4} x \sec^2 x dx = \int \tan^{-4} x (\tan^2 x + 1) dx$
- $= \int (1 - \sin^2 x)^2 \cos x \cos^{-2} x dx$
- $= \dots$
- Untuk m ganjil, n sembarang
- $\int \cot^5 x \operatorname{cosec}^{-4} x dx = \int \cot^4 x \operatorname{cosec}^{-4} x \cot x dx$
- $= \int (\operatorname{cosec}^2 x - 1)^2 \operatorname{cosec}^{-4} x \cot x dx$
- $= \dots$

Integral Fungsi Trigonometri

- Jenis 5 $\int \sin mx \cos nx \, dx$
- $\int \sin 5x \cos 4x \, dx = \int \frac{1}{2} (\sin(5 + 4)x + \sin(5 - 4)x) dx$
- $\int \frac{1}{2} \sin(9)x \, dx + \int \frac{1}{2} \sin(1)x \, dx$
- $\int \frac{1}{2} \sin(9x) \, d(9x) + \int \frac{1}{2} \sin(1)x \, dx$
- $= \dots$
- $\int \cos 5x \cos 4x \, dx = \int \frac{1}{2} (\cos(5 + 4)x + \cos(5 - 4)x) dx$
- $= \dots$

Terima Kasih

Hibah E-learning IDB 2015

rosita_kusumawati@uny.ac.id