

Responsi untuk UAS Kalkulus II

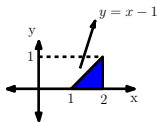
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1. 1.1 Hitung $\int (x + 1) \cos x \, dx$
1.2 Hitung $\int \frac{2x}{(x+1)(x+2)} dx$

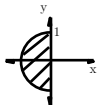
2.

hitung $\iint_A (1 + x) \, dA$ dengan area A :



3.

hitung $\iint_A (2 + y) \, dA$ dengan area A :



4. Hitung $\iiint_V (1 + 2z) \, dV$ dengan batas:
 $x = 0$; $x = y$; $y = 0$; $y = 2$; $z = 0$; $z = 3$

1. 1.1 Hitung $\int (x+1) \cos x \, dx$

Jawab:
$$\begin{aligned}\int (x+1) \cos x \, dx &= \int (x+1) d(\sin x) \\ &= (x+1) \sin x + \int \sin x \, d(x+1) \\ &= (x+1) \sin x + \int \sin x \, dx \\ &= (x+1) \sin x + \cos x + C\end{aligned}$$

1. 1.2 Hitung $\int \frac{2x}{(x+1)(x+2)} dx$

Jawab:
$$\frac{2x}{(x+1)(x+2)} = \frac{A}{x+1} + \frac{B}{x+2}$$
$$= \frac{A(x+2) + B(x+1)}{(x+1)(x+2)} = \frac{x(A+B) + 2A+B}{(x+1)(x+2)}$$

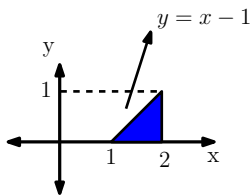
$$\begin{aligned} A+B &= 2 \\ 2A+B &= 0 \\ \hline -A &= 2 \implies A = -2 \implies B = 2-A = \underline{4} \end{aligned}$$

$$\int \frac{2x}{(x+1)(x+2)} dx = \int \left(\frac{-2}{x+1} + \frac{4}{x+2} \right) dx = -2 \ln|x+1| + 4 \ln|x+2| + C$$

2. Hitung $\int \frac{2x}{(x+1)(x+2)} dx$

Repeated - Skipped

3. hitung $\iint_A (1+x) dA$ dengan area A :



Jawab:

$$\iint_A (1+x) dA = \int_{x=1}^2 \int_{y=0}^{x-1} (1+x) dy dx$$

$$= \int_{x=1}^2 (1+x) y \Big|_0^{x-1} dx$$

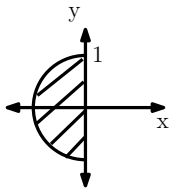
$$= \int_{x=1}^2 (1+x)(x-1-0) dx$$

$$= \int_{x=1}^2 (x^2 - 1) dx = \frac{1}{3} x^3 - x \Big|_1^2$$

$$= \frac{1}{3} (2^3 - 1^3) - (2 - 1)$$

$$= 2 - 1 = 1 //$$

4. hitung $\iint_A (2+y) dA$ dengan area A :



$$\begin{aligned} \text{Jawab: } \iint_A (2+y) dA &= \int_{r=0}^1 \int_{\theta=\frac{\pi}{2}}^{\frac{3\pi}{2}} (2 + r \sin \theta) r d\theta dr \\ &= \int_{r=0}^1 \int_{\theta=\frac{\pi}{2}}^{\frac{3\pi}{2}} (2r + r^2 \sin \theta) d\theta dr \\ &= \int_{r=0}^1 (2r\theta - r^2 \cos \theta) \Big|_{\theta=\frac{\pi}{2}}^{\frac{3\pi}{2}} dr \\ &= \int_{r=0}^1 \left(2r \left(\frac{3\pi}{2} - \frac{\pi}{2} \right) - r^2 \left(\cos \frac{3\pi}{2} - \cos \frac{\pi}{2} \right) \right) dr \\ &= \int_{r=0}^1 (2\pi r - r^2(0-0)) dr \\ &= \int_{r=0}^1 2\pi r dr = \pi r^2 \Big|_{r=0}^1 = \pi \end{aligned}$$

5.

Hitung $\iiint_V (1 + 2z) dV$ dengan batas:

$$x = 0; x = y; y = 0; y = 2; z = 0; z = 3$$

Jawab:

$$\begin{aligned} \iiint_V (1 + 2z) dV &= \int_{y=0}^2 \int_{z=0}^3 \int_{x=0}^y (1 + 2z) dx dz dy \\ &= \int_{y=0}^2 \int_{z=0}^3 (1 + 2z) \cdot x \Big|_{x=0}^y dz dy \\ &= \int_{y=0}^2 \int_{z=0}^3 (1 + 2z)y dz dy = \int_{y=0}^2 \int_{z=0}^3 (y + 2yz) dz dy \\ &= \int_{y=0}^2 \left(yz + yz^2 \Big|_{z=0}^3 \right) dy \\ &= \int_{y=0}^2 (3y + 9y^2) dy = \frac{3}{2} y^2 + 3y^3 \Big|_{y=0}^2 \\ &= \frac{3}{2} (2^2 - 0^2) + 3(2^3 - 0^3) \\ &= 6 + 24 = \underline{\underline{30}} \end{aligned}$$