UAS Matematika 2016/2017

No.

Date :

1. a. $\int 5x^{-\frac{2}{3}}\,dx = 5 \cdot 3 \cdot x^{\frac{1}{3}} + c$

$= 15\,x^{\frac{1}{3}} + c$

b. $\int (5x^3 + 3x^2 + 7)\,dx = \frac{5}{4}x^4 + x^3 + 7x + c$

c. $\int x e^{2x}\,dx = \frac{xe^{2x}}{2} - \int \frac{e^{2x}}{2}\,dx = \frac{xe^{2x}}{2} - \frac{1}{4}\int e^u\,du$

$= \frac{xe^{2x}}{2} - \frac{e^{2x}}{4} + c$

$= \frac{(2x-1)e^{2x}}{4} + c$

d. $\int \sin(2x)\, e^{3x}\,dx = \frac{e^{3x}\sin(2x)}{3} - \int \frac{2e^{3x}\cos(2x)}{3}\,dx$

$= \frac{e^{3x}\sin(2x)}{3} - \frac{2e^{3x}\cos(2x)}{9} - \int \frac{4e^{3x}\sin(2x)}{9}$

$\frac{13}{9}\int \sin(2x)e^{3x}\,dx = \; \frac{e^{3x}\sin(2x)}{3} - \frac{2e^{3x}\cos(2x)}{9}$

$\int \sin(2x)e^{3x}\,dx = \frac{3e^{3x}\sin(2x) - 2e^{3x}\cos(2x)}{13}$

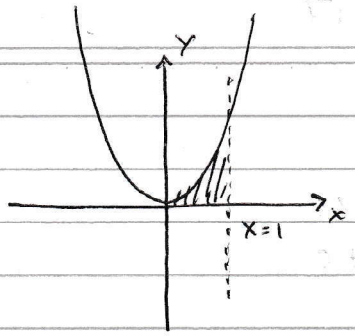
e. $\int_1^2 (5x^4 + 7x^2 + 5)\,dx = x^5 + \frac{7}{3}x^3 + 5x \Big]_1^2$

$= \left(2^5 + \frac{7}{3}\cdot 2^3 + 5\cdot 2\right) - \left(1^5 + \frac{7}{3}\cdot 1^3 + 5\cdot 1\right)$

$= \left(32 + \frac{56}{3} + 10\right) - \left(6 + \frac{7}{3}\right)$

$= 36 + \frac{49}{3} = \frac{108 + 49}{3} = \frac{157}{3}$

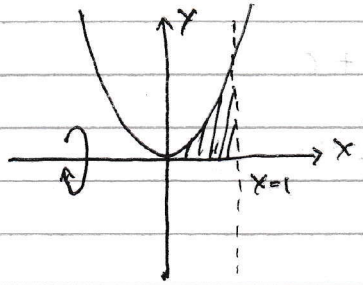
2. a.



$$\int_0^1 2x^2\,dx = \frac{2}{3}x^3\Big]_0^1$$

$$= \frac{2}{3} \text{ satuan luas}$$

b.

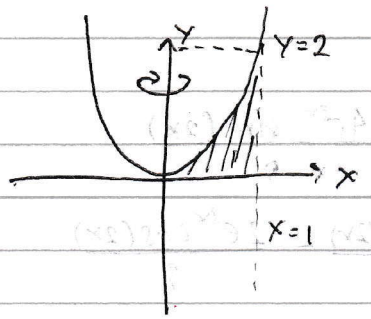


$$\pi \int_0^1 (2x^2)^2\,dx = \pi\left(\frac{4}{5}x^5\Big]_0^1\right)$$

$$= \pi\,(4/5)$$

$$= \frac{4}{5}\pi \text{ satuan volume}$$

c.



$y = 2x^2$

$x = \sqrt{\frac{y}{2}}$

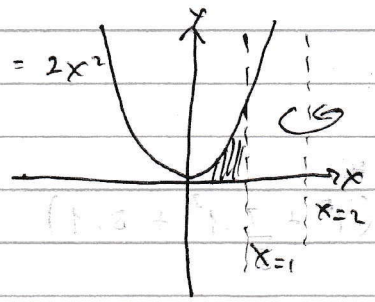
$$\pi \int_0^2 (1)^2 - \left(\sqrt{\frac{y}{2}}\right)^2 dy$$

$$= \pi\left(y - \frac{y^2}{4}\Big]_0^2\right)$$

$$= \pi\left[\left(2 - \frac{4}{4}\right) - \left(0 - \frac{0^2}{4}\right)\right]$$

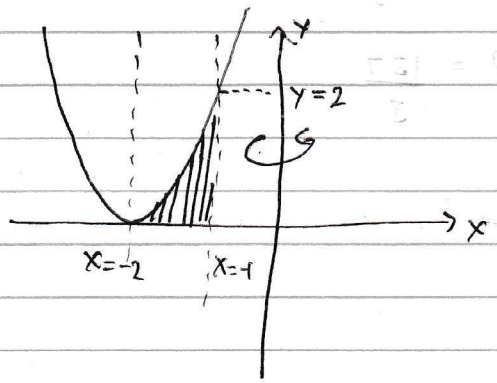
$$= \pi\,(1) = \pi \text{ satuan volume}$$

d. $y = 2x^2$



Sama seperti jika x digeser sebanyak 2 kekiri dan diputar terhadap sumbu y

$y = 2x^2 \Rightarrow y = 2(x+2)^2$



$y = 2(x+2)^2$

$x = \sqrt{\frac{y}{2}} - 2$

$$\pi \int_0^2 \left(\sqrt{\frac{y}{2}} - 2\right)^2 - (-1)^2\,dy$$

$$= \pi \int_0^2 \left(\frac{y}{2} - 4\sqrt{\frac{y}{2}} + 4\right) - 1\,dy$$

$$= \pi\left(\frac{y^2}{4} - 4\sqrt{2}\sqrt{y^3} + 3y\Big]_0^2\right)$$

$$= \pi\left(\frac{4}{4} - 4\sqrt{2}\sqrt{8} + 6\right)$$

$$= \pi\,(7 - 8\sqrt{2})$$

$$= (7 - 8\sqrt{2})\pi \text{ satuan volume}$$