Kop Quiz 7

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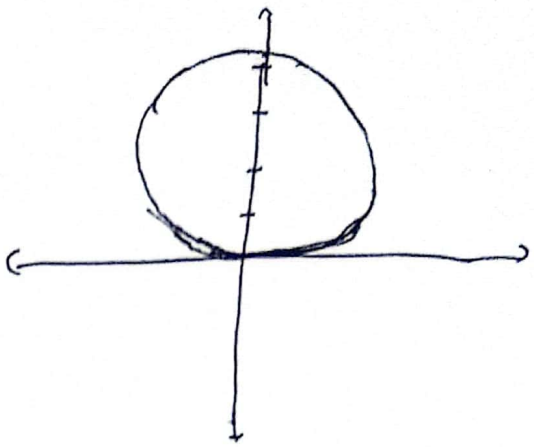
① a. $r^2 = 18 \cdot \sin\theta \rightarrow r = \sqrt{18 \cdot \sin\theta}$

Bentuk : limaçons
ke inner loop

θ	r
0°	0
90°	$\sqrt{18} \approx 4.2$
180°	0

Skets ⇒



Luas → $\frac{1}{2}\int_0^{\pi/2} (18 \cdot \sin\theta \, d\theta) \Rightarrow 18\int_0^{\pi/2} \sin\theta \, d\theta \Rightarrow 18\left(-\cos\theta \Big|_0^{\pi/2}\right)$

$\Rightarrow 18\left(-\cos\frac{\pi}{2} + \cos 0\right) \Rightarrow 18(1) = 18$ //

② ③ Cardioid $r = \sqrt{3} + \sin\theta$ dalam dan Circle $r = 3\sin\theta$ luar

$r = \sqrt{3} + \sin\theta$

Bentuk

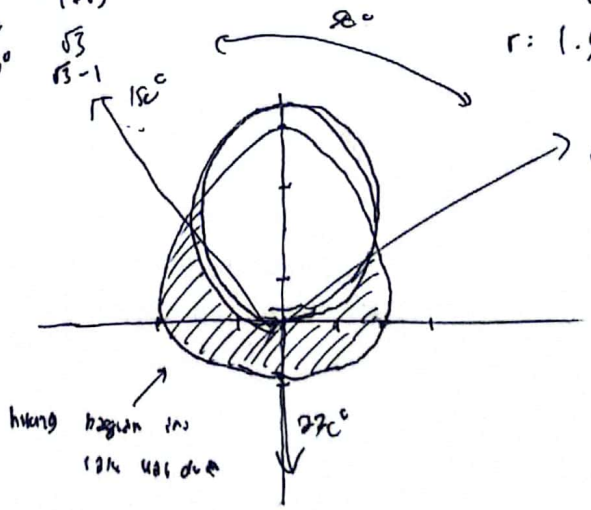
θ	r
0°	$\sqrt{3}$
90°	$1+\sqrt{3}$
180°	$\sqrt{3}$
270°	$\sqrt{3}-1$

Circle bawah ⇒ $\theta = 0$ ⇒ $r = 3 \cdot \sin\theta = 0$

atas ⇒ $\theta = 90^\circ$ ⇒ $r = 3\sin 90^\circ = 3$

$r = 1.5$ dan pada $\theta = 5$

Gambar Skets :



$r_1 = r_2$

$\Rightarrow \sqrt{3} + \sin\theta = 3\sin\theta$

$2\sin\theta = \sqrt{3}$

$\sin\theta = \frac{1}{2}\sqrt{3}$

$\theta = 60^\circ$

$$\Rightarrow 2\left(\frac{1}{2}\int_{\frac{5\pi}{6}}^{3/2\pi} \left((\sqrt{3} + \sin\theta)^2 - (3\sin\theta)^2\right) d\theta\right)$$

Dipindai dengan CamScanner

$$A = \left(\frac{1}{2} \int_{\frac{5\pi}{6}}^{3/2\pi} (\sqrt{3} + \sin\theta)^2 - (3\sin\theta)^2 \, d\theta \right) \Rightarrow \int_{\frac{5\pi}{6}}^{3/2\pi} 3 + 2\sqrt{3}\sin\theta + \sin^2\theta - 9\sin^2\theta \, d\theta$$

$$\Rightarrow \int_{\frac{5\pi}{6}}^{3/2\pi} 3 + 2\sqrt{3}\sin\theta - 8\sin^2\theta \, d\theta \longrightarrow -8\left(\frac{1}{2}(1 - \cos 2\theta)\right) \Rightarrow \int -4 + 4\cos 2\theta$$

$$\Rightarrow 3\theta - 2\sqrt{3}\cos\theta - 4\theta + 2\sin 2\theta \Big|_{5/6\pi}^{3/2\pi}$$

$$\Rightarrow 2\sin 2\theta - 2\sqrt{3}\cos\theta - \theta \Big|_{5/6\pi}^{3/2\pi}$$

$$\Rightarrow \left(2\sin 3\pi - 2\sqrt{3}\cos\tfrac{3}{2}\pi - \tfrac{3}{2}\pi\right) - \left(2\sin\tfrac{5}{3}\pi - 2\sqrt{3}\cos\tfrac{5}{6}\pi - \tfrac{5}{6}\pi\right)$$

$$\Rightarrow \left(2.0 - 2\sqrt{3}.0 - \tfrac{3}{2}\pi\right) - \left(2.-\tfrac{1}{2}\sqrt{3} - 2\sqrt{3}.-\tfrac{1}{2}\sqrt{3} - \tfrac{5}{6}\pi\right)$$

$$\Rightarrow -\tfrac{3}{2}\pi + \sqrt{3} - 3 + \tfrac{5}{6}\pi$$

$$A \Rightarrow \sqrt{3} - 3 - \tfrac{9}{6}\pi + \tfrac{5}{6}\pi$$

$$\Rightarrow \sqrt{3} - 3 - \tfrac{4}{6}\pi$$

$$A \Rightarrow \left|\sqrt{3} - 3 - \tfrac{2}{3}\pi\right| //$$

Dipindai dengan CamScanner

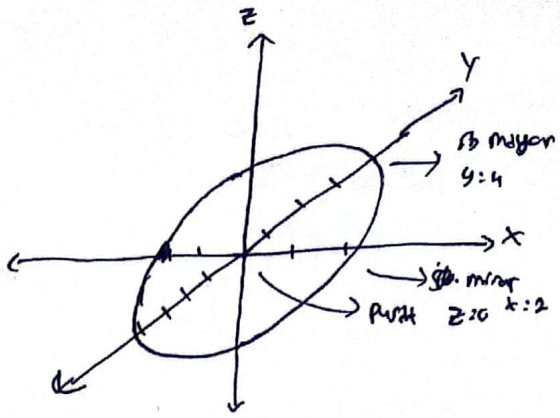
③. a. $f(x,y) = 4x^2 + y^2 - 16$, $C = 0$, dan $C = 9$

Pada $C = 0 \Rightarrow z = 0 \Rightarrow f(x,y) = 0$

↳ $4x^2 + y^2 - 16 = 0$

$4x^2 + y^2 = 16$

$\Rightarrow \frac{x^2}{4} + \frac{y^2}{16} = 1$ → Bentuk ellips dgn Sb. mayor di $y = 4$ dan Sb minor di $x = 2$ berpusat di titik $z = 0$



Pada $C = 9 \Rightarrow z = 9 \Rightarrow f(x,y) = 9$

$4x^2 + y^2 - 16 = 9$

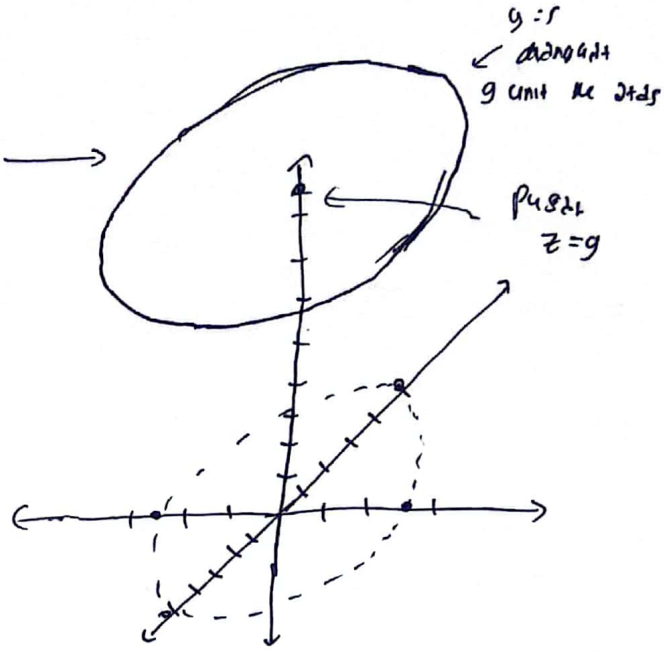
$4x^2 + y^2 = 25$

$\frac{x^2}{\frac{25}{4}} + \frac{y^2}{25} = 1$

↳ ellips dgn Sb. mayor di $y = 5$ dan Sb minor di $x = \frac{5}{2}$ atau 2,5 dan berpusat pada $z = 9$

$x = 2{,}5$ digeser 9 unit ke atas

$y = 5$ digeser 9 unit ke atas



④. a $f(x,y) = xy^2 - 6x^2 - 3y^2$ pada $A(1,-1)$ dan $D(1,-1)$

$f_x(x,y) = y^2 - 12x$

$f_y(x,y) = 2xy - 6y$

* f_{xx} (turunan f_x thdp x)

$f_{xx}(x,y) = 0 - 12 = -12$

$f_{xx}(x,y) = -12$

di $A(1,-1) \Rightarrow f_{xx}(1,-1) = -12$

* f_{xy}

$f_{xy}(x,y) = 2y$

Pd $A(1,-1) \Rightarrow f_{xy}(1,-1) = -2$

* f_{yy}

$f_{yy}(x,y) = 2x - 6$

Pd $A(1,-1) \Rightarrow f_{yy}(1,-1) = -4$

Hitung $D(1,-1) \Rightarrow f_{xx}(1,-1) \cdot f_{yy}(1,-1) - f^2_{xy}(1,-1)$

$\Rightarrow -12 \cdot -2 - (-4)^2$

$\Rightarrow 24 - 16$

$\Rightarrow 8$ //

Dipindai dengan CamScanner