Solutions

Each answer shows the steps, then the **result**.

2.1

- $A = \dfrac{1}{2}\displaystyle\int_{\alpha}^{\beta} \left(r_1^2 - r_2^2\right) d\theta$

2.2

- $2 = 4\cos\theta \Rightarrow \cos\theta = \frac{1}{2} \Rightarrow \theta = \pm\frac{\pi}{3}$

2.3

- $r = 4\cos\theta$ is larger (at $\theta = 0$: $4 > 2$)

3.1 B

- half the integral of the difference of the squared radii

3.2

(a)

- $1 = 2\cos\theta \Rightarrow \cos\theta = \frac{1}{2} \Rightarrow \theta = \pm\frac{\pi}{3}$

(b)

- $A = \dfrac{1}{2}\displaystyle\int_{-\pi/3}^{\pi/3} \left((2\cos\theta)^2 - 1^2\right) d\theta$

3.3

- Each sector's area is $\frac{1}{2}r^2\,d\theta$, so the region between is $\frac{1}{2}(r_1^2 - r_2^2)\,d\theta$ — a difference of the two **squared** radii; $(r_1 - r_2)^2$ would wrongly square the difference of the radii instead