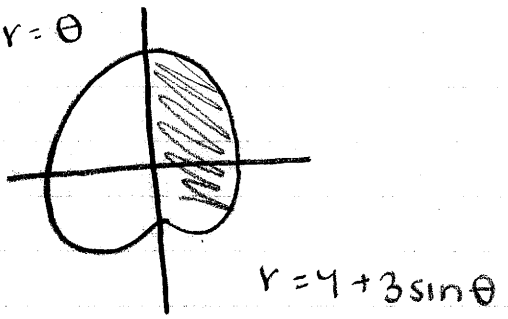
Kristen
Ben
Andrew
Allison

Pg. 683 7, 19, 23, 29

7.) $r = \theta$



$r = 4 + 3\sin\theta$

$$A = \int_a^b \frac{1}{2} r^2 \, d\theta$$

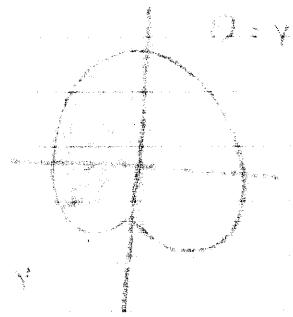
$$A = \int_{\pi/2}^{3\pi/2} \frac{1}{2}(4+3\sin\theta)^2 \, d\theta$$

$$A = \frac{1}{2}\int_{\pi/2}^{3\pi/2} (4+3\sin\theta)^2 \, d\theta$$

$$A = \frac{1}{2}\int_{\pi/2}^{3\pi/2} (16 + 24\sin\theta + 9\sin^2\theta) \, d\theta$$

$$A = \frac{1}{2}\left(16\theta + (-24\cos\theta) + 9\left(\frac{1}{2}\theta - \frac{1}{4}\sin 2\theta\right)\right) + C$$

$$A = \frac{1}{2}\left(16\theta - 24\cos\theta + \frac{9}{2}\theta - \frac{9}{4}\sin 2\theta\right)\Big|_{\pi/2}^{3\pi/2}$$



Will R, Adam B, Thomas

Polar Area

Pg 683. # 7, 19, 23, 29

7. $r = 4 + 3\sin\theta$

$= \frac{1}{2}\int_{-\pi/2}^{\pi/2}(4 + 3\sin\theta)^2 d\theta$

$= \frac{1}{2}\int_{-\pi/2}^{\pi/2}(16 + 24\sin\theta + 9\sin^2\theta)d\theta$

$= \frac{1}{2}\int_{-\pi/2}^{\pi/2}(16 + 24\sin\theta + \frac{9}{2} + \frac{9}{2}\cos(2\theta))d\theta$

$= \frac{1}{2}(\frac{41}{2}\theta - 24\cos\theta + \frac{9}{4}\sin 2\theta)\Big|_{-\pi/2}^{\pi/2}$

$= \frac{1}{2}(\frac{41\pi}{4} - (-\frac{41\pi}{4}))$

$= \boxed{\frac{41\pi}{4}}$

19. $r = 3\cos 5\theta$

$= \int_0^{\pi/10}(3\cos 5\theta)^2 d\theta$

$= \int_0^{\pi/10} 9\cos^2 5\theta \, d\theta$

$= 9\int_0^{\pi/10}(\frac{1 - \cos 10\theta}{2})d\theta$

$= \frac{9}{2}\int_0^{\pi/10}(1 - \cos 10\theta)d\theta$

$= \frac{9}{2}(\theta - \frac{1}{10}\sin 10\theta)\Big|_0^{\pi/10}$

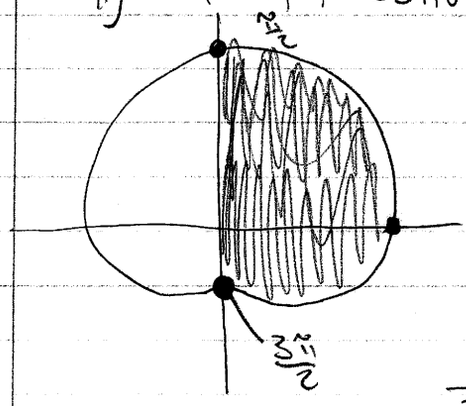
$= \frac{9}{2}(\frac{\pi}{10} - 0)$

$= \boxed{\frac{9\pi}{20}}$

23. $r = 4\sin\theta$, $r = 2$

Tanner Bent
Andy Chleborad
Justin Ashley

7) $r = 4 + 3\sin\theta$



$$\frac{1}{2}\int_{\frac{3\pi}{2}}^{\frac{\pi}{2}} (4+3\sin\theta)^2\, d\theta$$

$$\frac{1}{2}\int_{\frac{3\pi}{2}}^{\frac{\pi}{2}} 16 + 9\sin^2\theta + 24\sin\theta\, d\theta$$

$$\frac{1}{2}\int_{\frac{3\pi}{2}}^{\frac{\pi}{2}} \frac{9}{2}(1-\cos 2\theta) + 16 + 24\sin\theta\, d\theta$$

$$\frac{1}{2}\left(\frac{9}{4}(\theta - \sin 2\theta) + 16\theta - 24\cos\theta\right)\Bigg|_{\frac{3\pi}{2}}^{\frac{\pi}{2}}$$

$$\frac{9}{8}(\theta - \sin 2\theta) + 8\theta - 12\cos\theta\Bigg|_{\frac{3\pi}{2}}^{\frac{\pi}{2}}$$

$$\left[\frac{9}{8}\left(\frac{\pi}{2} - 0\right) + \frac{8\pi}{2} - 0\right] - \left[\frac{9}{8}\left(\frac{3\pi}{2} - 0\right) + \frac{24\pi}{2} - 0\right]$$

$$\left(\frac{9\pi}{16} + 4\pi\right) - \left(\frac{27\pi}{16} + 12\pi\right)$$

$$\frac{144\pi}{16} + 8\pi = \frac{9\pi}{8} + 8\pi$$