

10.3

41)

$$r = 2 - 3\sin\theta$$

$$x = (2 - 3\sin\theta)\cos\theta \quad y = (2 - 3\sin\theta)\sin\theta$$

$$\frac{dx}{d\theta} = -3\cos^2\theta - \sin\theta(2 - 3\sin\theta)$$

~~$\frac{dy}{d\theta}$~~

$$\frac{dy}{d\theta} = -3\cos\theta\sin\theta + \cos\theta(2 - 3\sin\theta)$$

$$\frac{dy}{dx} = \frac{\frac{dy}{d\theta}}{\frac{dx}{d\theta}} = \frac{-3\cos\theta\sin\theta + \cos\theta(2 - 3\sin\theta)}{-3\cos^2\theta - \sin\theta(2 - 3\sin\theta)}$$

$$\theta = 0$$

. 99

. 966

-.034

$$\theta = \frac{\pi}{2}$$

$$\theta = \frac{3\pi}{2}$$

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$$\int_{-9.42}^{-0.63} 4\cos 2\theta d\theta + \int_{-3.79}^{-\pi} + \int_{8.63}^{8.77}$$

47)

$$r^2 = 4\cos 2\theta$$

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$$r = \pm \sqrt{4\cos 2\theta}$$

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-3\pi, 3\pi

$$r^2 = 4\cos 2\theta$$

$$\frac{1}{2} \int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} 4\cos 2\theta d\theta$$

$$r = \pm \sqrt{4\cos 2\theta}$$

$$\frac{1}{2} \int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} 4\cos 2\theta d\theta$$

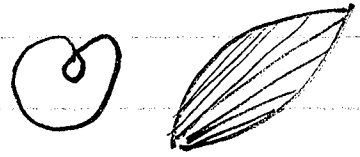
$$53) \frac{1}{2} \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} (2)^2 d\theta + \frac{1}{2} \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (2(1 - \cos\theta))^2 d\theta$$

$$29) r \cdot r = 8\sin\theta \cdot r$$

$$r^2 = 8r\sin\theta \rightarrow x^2 + y^2 = 8y$$

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29 cont)  $x^2 + y^2 = 8y$   
 $x^2 + (y^2 - 8y) = 0$



51)  $\frac{1}{2} \int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} (2 \cos \theta)^2 d\theta + \frac{1}{2} \int_0^{\frac{\pi}{4}} (2 \sin \theta)^2 d\theta$

39)  $r = -1 + \sin \theta$

$x = (-1 + \sin \theta) \cos \theta$

$\frac{dx}{d\theta} = \cos^2 \theta + -\sin \theta (-1 + \sin \theta)$

$y = (-1 + \sin \theta) \sin \theta$

$\frac{dy}{d\theta} = \cos \theta \sin \theta + \cos \theta (-1 + \sin \theta)$

$$\frac{dy}{dx} = \frac{\frac{dy}{d\theta}}{\frac{dx}{d\theta}} = \frac{\cos \theta \sin \theta + \cos \theta (-1 + \sin \theta)}{\cos^2 \theta - \sin \theta (-1 + \sin \theta)}$$

0,

 $\pi,$