

Pg. 548 #27-35 odd, 50 9.2 Homework

#27

$$x = \cos t \quad y = \sin t \quad 0 \leq t \leq 2\pi$$

$$\frac{dx}{dt} = -\sin(t) \quad \frac{dy}{dt} = \cos(t)$$

$$L = \int_0^{2\pi} \sqrt{\sin^2 t + \cos^2 t} dt = \int_0^{2\pi} 1 dt = t \Big|_0^{2\pi} = 2\pi$$

29.

$$x = 8\cos t + 8t\sin t \quad y = 8\sin t - 8t\cos t \quad 0 \leq t \leq \pi/2$$

$$\frac{dx}{dt} = -8\sin t + 8t\cos t + 8\sin t \quad \frac{dy}{dt} = 8\cos t + 8t\sin t - 8\cos t$$

$$L = \int_0^{\pi/2} \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2} dt = \pi^2$$

Calc Ok

31.

$$x = \frac{(2t+3)^{3/2}}{3} \quad y = t + \frac{t^2}{2} \quad 0 \leq t \leq 3$$

$$\frac{dx}{dt} = \frac{(2t+3)^{1/2}}{2} \cdot 2 \quad \frac{dy}{dt} = 1+t$$

$$L = \int_0^3 \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2} dt = \frac{21}{2}$$

Calc Ok

33.

$$x = \frac{1}{3}t^3 \quad y = \frac{1}{2}t^2 \quad 0 \leq t \leq 1$$

$$\frac{dx}{dt} = t^2 \quad \frac{dy}{dt} = t$$

$$L = \int_0^1 \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2} dt = \frac{2\sqrt{2}-1}{3}$$

Calc Ok

35.

a)  $x = \cos(2t) \quad y = \sin(2t) \quad 0 \leq t \leq \pi/2$

$$\frac{dx}{dt} = -2\sin(2t) \quad \frac{dy}{dt} = 2\cos(2t)$$

$$L = \int_0^{\pi/2} \sqrt{4\sin^2(2t) + 4\cos^2(2t)} dt = \int_0^{\pi/2} \sqrt{4(1)} dt = \int_0^{\pi/2} 2 dt = 2t \Big|_0^{\pi/2} = \pi$$

b)  $x = \sin(\pi t) \quad y = \cos(\pi t) \quad -1/2 \leq t \leq 1/2$

$$\frac{dx}{dt} = \pi\cos(\pi t) \quad \frac{dy}{dt} = -\pi\sin(\pi t)$$

$$L = \int_{-1/2}^{1/2} \sqrt{\pi^2\cos^2(\pi t) + \pi^2\sin^2(\pi t)} dt = \int_{-1/2}^{1/2} \sqrt{\pi^2(1)} dt = \int_{-1/2}^{1/2} \pi dt = \pi t \Big|_{-1/2}^{1/2} = \frac{\pi}{2} + \frac{\pi}{2} = \pi$$

50.

$$x = 6\sin t - 3\sin(7t) \quad y = 6\cos t - 3\cos(7t)$$

$$\frac{dx}{dt} = 6\cos t - 21\cos(7t) \quad \frac{dy}{dt} = -6\sin t + 21\sin(7t)$$

(D) but should read:  $\int_0^{2\pi} \sqrt{(6\cos t - 21\cos(7t))^2 + (-6\sin t + 21\sin(7t))^2} dt$

↑  
plus sign

There is no right answer,