7.1

$3t^{1/2}$

9) $a(t) = 1 + 3\sqrt{t}$ mph/sec $\qquad \dfrac{\text{mi}}{\text{hr}\cdot\text{sec}}$

(a) $\int a(t) = v(t) = t + 2t^{3/2} + c$

$v(t) = t + 2t^{3/2}$ mph

$v(9) = 9 + 2(9)^{3/2} = 63$ mph

$\cancel{\int_0^{9/3600} |t + 2t^{3/2}|\, dt}$

$\boxed{.065\text{ mi}}$

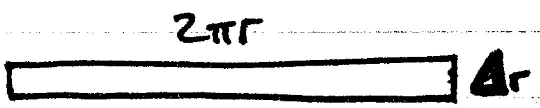
$$\int_{0\text{ sec}}^{9\text{ sec}} \left| \frac{1}{3600}(t + 2t^{3/2})\, dt \right| = .06525\text{ mi}$$

$\times 5280$

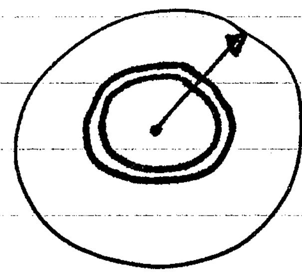
$\boxed{344.520\text{ ft}}$

23) (a) population density $= 10,000\,(2-r) \approx 0$ people/mi^2

$r = 2$ mi

(b) 

$A = 2\pi r\,\Delta r$



(c) $\underbrace{10,000\,(2-r)}_{\text{people/mi}^2}\,(2\pi r)\,\Delta r$

people/mi^2 $\times$ mi^2 = people

(d) $\int_0^2 10,000\,(2-r)(2\pi r)\,\Delta r$

7.1

11) $a(t) = -32$

$v(t) = -32t + C$

$-32t + 90$

$v(3) = -32(3) + 90 = \boxed{-6 \text{ ft/sec}}$

(b) $s(t) = -16t^2 + 90t + C$

$= -16t^2 + 90t = 0$

$0,$ 5.625 sec

(c) $\int_0^{5.625} (-32t + 90\,dt) = \boxed{0 \text{ ft}}$

(d) $\int_0^{5.625} |-32t + 90\,dt| = \boxed{253.125 \text{ ft}}$

7.1

11) $a(t) = -32$

$v(t) = -32t + c$

$v(t) = -32t + 90$ (a) $v(3) = -32(3) + 90 = \boxed{-6 \text{ ft/sec}}$

$s(t) = -16t^2 + 90t + C$

$s(t) = -16t^2 + 90t$ (b) $-16t^2 + 90t = 0$

$t = \cancel{0}, 5.625 \text{ sec}$

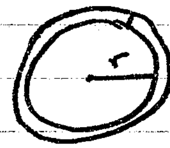
(c) $\int_0^{5.625} (-32t+90)\,dt = 0 \text{ ft}$

(d) $\int_0^{5.625} |-32t+90|\,dt = \boxed{253.125 \text{ ft}}$

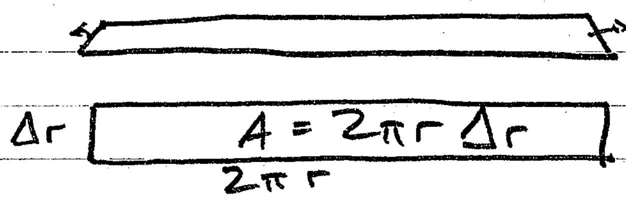
23) (a) $10{,}000(2-r) \approx 0$

$\boxed{r = 2 \text{ miles}}$

(b)

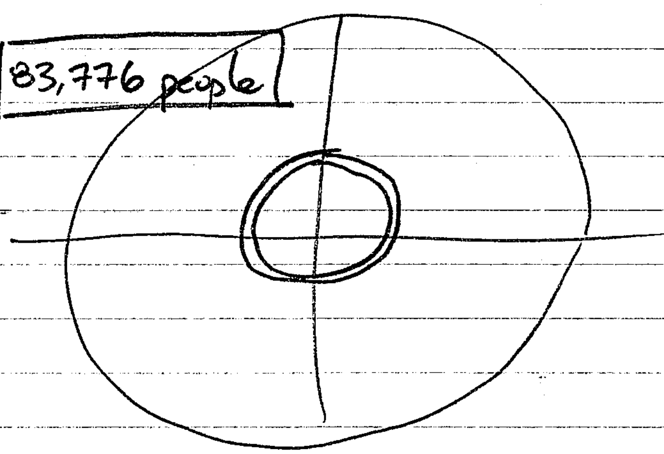


(c) $\underbrace{10{,}000(2-r)}_{\text{POPULATION DENSITY}} \underbrace{(2\pi r)\Delta r}_{\text{AREA}}$



$\frac{\text{PEOPLE}}{\cancel{\text{SQ MI}}} \cdot \cancel{\text{SQ}}.\text{MI.} = \text{PEOPLE}$

$\int_0^2 10{,}000(2-r)(2\pi r)\,dr = \boxed{83{,}776 \text{ people}}$



7.1

9) $a(t) = 1 + 3t^{1/2}$

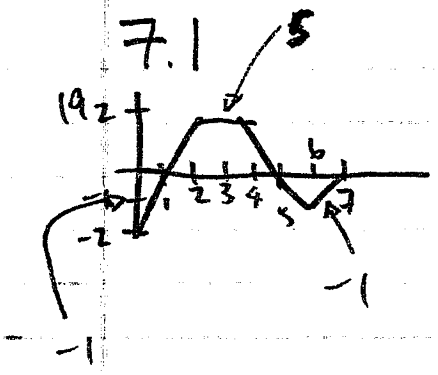
$v(t) = t + 2t^{3/2} + C$

$v(t) = t + 2t^{3/2}$ (a) $v(9) = 9 + 2(9)^{3/2} = 63$ mph

$\int_0^9 \frac{t + 2t^{3/2}}{3600} \, dt = \boxed{.065 \text{ mi}}$

$\frac{m}{hr} \quad \frac{1\ hr}{\cancel{36}\ sec} \quad \frac{m}{sec}$

7.1



(a) $2 + \int_0^7 f(x)\,dx$

$2 + 3 = 5$

(b) $\int_0^7 |f(x)|\,dx$

$5 + 1 + 1 = 7$