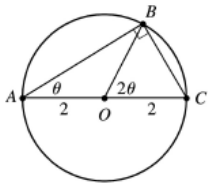
42.



In isosceles triangle AOB, $\angle O=180^\circ-\theta-\theta$, so $\angle BOC=2\theta$. The distance rowed is $4\cos\theta$ while the distance walked is the length of arc $BC=2(2\theta)=4\theta$. The time taken is given by

$$T(\theta)=\frac{4\cos\theta}{2}+\frac{4\theta}{4}=2\cos\theta+\theta,\ 0\le\theta\le\frac{\pi}{2}.\ T'(\theta)=-2\sin\theta+1=0\Leftrightarrow\sin\theta=\frac{1}{2}\Rightarrow\theta=\frac{\pi}{6}.$$

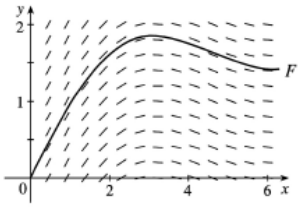
Check the value of T at $\theta=\frac{\pi}{6}$ and at the endpoints of the domain of T; that is, $\theta=0$ and $\theta=\frac{\pi}{2}$. $T(0)=2$, $T\left(\frac{\pi}{6}\right)=\sqrt{3}+\frac{\pi}{6}\approx 2.26$, and $T\left(\frac{\pi}{2}\right)=\frac{\pi}{2}\approx 1.57$. Therefore, the minimum value of T is $\frac{\pi}{2}$ when $\theta=\frac{\pi}{2}$; that is, the woman should walk all the way. Note that $T''(\theta)=-2\cos\theta<0$ for $0\le\theta<\frac{\pi}{2}$, so $\theta=\frac{\pi}{6}$ gives a maximum time.

55.

x	$f(x)$
0	1
0.5	0.959
1.0	0.841
1.5	0.665
2.0	0.455
2.5	0.239
3.0	0.047

x	$f(x)$
3.5	−0.100
4.0	−0.189
4.5	−0.217
5.0	−0.192
5.5	−0.128
6.0	−0.047

We compute slopes [values of $f(x)=(\sin x)/x$ for $0<x<2\pi$] as in the table $\left[\lim_{x\to 0^+} f(x)=1\right]$ and draw a direction field as in Example 6. Then we use the direction field to graph F starting at $(0,0)$



14. We can find an upper estimate by using the final velocity for each time interval. Thus, the distance d traveled after 62 seconds can be approximated by

$$d=\sum_{i=1}^{6} v\left(t_i\right)\Delta t_i=(185\text{ft/s})\,(10\text{s})+319\cdot 5+447\cdot 5+742\cdot 12+1325\cdot 27+1445\cdot 3=54,694\text{ ft}$$