where $\cos x = 1$, i.e., $x = 2n\pi$, n an integer.

72. $a = 4$ and $b = \dfrac{2\pi}{3.5} = \dfrac{4\pi}{7}$.

73. The height of the rider is modeled by

$$h = 30 - 25 \cos\left(\dfrac{2\pi}{40}t\right),$$ where $t = 0$ corresponds

to the time when the rider is at the low point. $h = 50$

when $\dfrac{-4}{5} = \cos\left(\dfrac{2\pi}{40}t\right)$. Then $\dfrac{2\pi}{40}t \approx 2.498$, so t

≈ 15.90 sec.

74. The length L must be the distance traveled in 30 min by an object traveling at 540 ft/sec:

$$L = 1800 \text{ sec} \cdot 540 \dfrac{\text{ft}}{\text{sec}} = 972{,}000 \text{ ft, or about 184 mi}$$

75. (a) A model of the depth of the tide is

$$d = 2\cos\left[\dfrac{\pi}{6.2}(t - 7.2)\right] + 9,$$ where t is hours since

midnight. The first low tide is at 1:00 A.M. ($t = 1$).

(b) At 4:00 A.M. ($t = 4$): about 8.90 ft. At 9:00 P.M. ($t = 21$): about 10.52 ft.

(c) 4:06 A.M. ($t = 4.1$ — halfway between 1:00 A.M. and 7:12 A.M.).