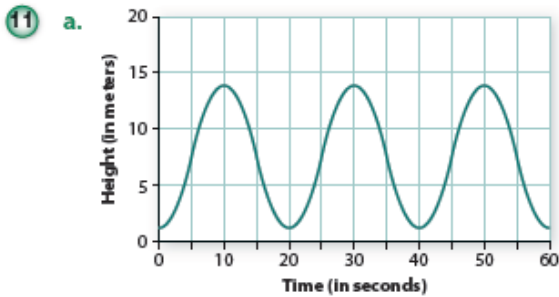


Solutions 6.2.4

- 10 a. i. Amplitude is 2; period is 2π ; y-displacement is 3
 ii. Amplitude is 3; period is 20π ; y-displacement is 5
 iii. Amplitude is 12; period is $\frac{2\pi}{3}$; y-displacement is -8
 b. $y = 7 \cos\left(\frac{1}{3}x\right) - 5$



b. Using 5-second increments, the table would be as follows:

x	0	5	10	15	20	25	30	35	40	45	50	55	60
y	1	7	13	7	1	7	13	7	1	7	13	7	1



d. The graph is periodic. The period is 20 seconds, which is $\frac{1}{3}$ minute, or 1 revolution. The minimum is 1 m, and the maximum is 13 m, so the amplitude is 6.

e. $h(t) = -6 \cos\left(\frac{\pi t}{10}\right) + 7$ and $h(t) = -6 \sin\left(\frac{\pi(t+5)}{10}\right) + 7$ both fit the data.

- 12 a. i. $d(t) = 5 \cos t$
 ii. $d(t) = \cos \pi t$
 iii. $d(t) = 5 \cos \pi t$

b. The pocket watch follows a path that begins 5 inches to the right from the vertical, so the initial value of the function should be 5. Since $\cos 0^\circ$ is 1, $5 \cos 0^\circ$ is 5. The two-second period requires the watch to stop and reverse direction every second, so the value of $\cos Bx$ should be -1 when $x = 1$. This is accomplished when $B = \pi$, or 180° . So, the desired model for the motion of the watch is $y = 5 \cos \pi x$. (This model ignores the effect of gravity.)

c. The graph follows:



The coordinates of the t -intercepts on the interval shown are $(-4.5, 0)$, $(-3.5, 0)$, $(-2.5, 0)$, $(-1.5, 0)$, $(-0.5, 0)$, $(0.5, 0)$, $(1.5, 0)$, $(2.5, 0)$, $(3.5, 0)$, and $(4.5, 0)$.

The maximum value of the function is 5, and the coordinates for the maximum points are $(-4, 5)$, $(-2, 5)$, $(0, 5)$, $(2, 5)$, and $(4, 5)$.

The minimum value of the function is -5 , and the coordinates of the minimum points are $(-3, -5)$, $(-1, -5)$, $(1, -5)$, and $(3, -5)$.

- 19
- a. The graph of $-\cos t$ is a reflection of the graph of $\cos t$ across the t -axis.
 - b. The graph of $5 + \sin t$ is a translation of the graph of $\sin t$ upward 5 units.
 - c. The graph of $5 \cos t$ is a stretch of the graph of $\cos t$ by a factor of 5 units away from the t -axis.

- 26
- a. Physical: 23 days
 - b. Emotional: 28 days
 - c. Intellectual: 33 days
 - d. The best dates to run a race would be when physical rhythms are high, about August 6 and August 28.

 **Just in Time**

41 a.

NOW	NEXT
0	3
1	5.5
2	8
3	10.5
4	13
5	15.5

b.

NOW	NEXT
0	450
1	175
2	37.5
3	-31.25
4	-65.625
5	-82.8125