# Section 2.4

2. $\pi/2$

6. $16\pi/9$

10. $120^\circ$

14. $100^\circ$

34. $\sqrt{3}/2$

36. $1/\sqrt{3} = \sqrt{3}/3$

40. $-1$

43. $-\sqrt{2}$

78.

(a) Expanding the expression inside the cosine yields

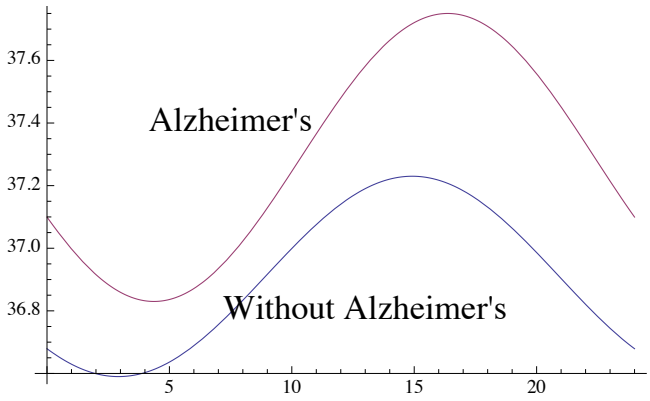
$$\frac{(t-6)\pi}{14.77} = \left(\frac{\pi}{14.77}\right) t - \frac{6\pi}{14.77}$$

Then, using the formula for the period on page 111 (with $b = \pi/14.77$) gives the period $2 \cdot 14.77 = 29.54$ (days). There is a lunar cycle every 29.54 days.

(b). Since the maximum value of the cosine function is $1 = \cos(0)$, the maximum number of consultations occurs when $t = 6$ (days) since January 16, 2014; that is, on January 22, 2014. The corresponding $y$ value is then 101.8, which corresponds to a percentage increase of 1.8% over the daily mean.

(c) Setting $t = 31 - 16 = 15$ yields $y \approx 99.39$ (percent of the daily mean).

81. (a)




The graphs do not intersect.

(b) $t = 14.92$ hours or around 2:55 PM

(c) $t = 16.37$ hours or around 4:22 PM

91. If $h$ denotes the height of the building in meters then $\tan 42.8^\circ = \dfrac{h}{65}$ and thus $h = 65 \tan 42.8^\circ \approx 60.2$ m.

92. Let $x$ denote the horizontal distance between the two sides of the canyon. Using the information in the problem and the right triangle in the upper right–hand portion of the figure, we see that $\cot 27^\circ = \dfrac{x}{105}$ and thus $x = 105 \cot 27^\circ \approx 206$ ft.