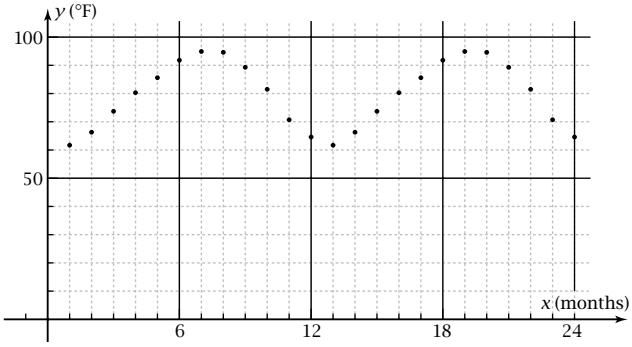
Exploration 2-5c

1. Draw as directed by the text.
2. $x \approx 580$ m, $y \approx 450$ m
3. $\tan 27° = \dfrac{y}{307 + x}$, $\tan 38° = \dfrac{y}{x}$
4. By rewriting the equations as $\cot 27° = \frac{307 \text{ m} + x}{y} = \frac{307 \text{ m}}{y} + \frac{x}{y}$ and $\cot 38° = \frac{x}{y}$, you get
   $y = \frac{307 \text{ m}}{\cot 27° - \cot 38°} = 449.7055\ldots \text{ m} \approx 450 \text{ m}$
   $x = \frac{307 \text{ m} \cdot \cot 38°}{\cot 27° - \cot 38°} = 575.5968\ldots \text{ m} \approx 576 \text{ m}$
5. Answers are reasonably close.
6. The actual height is 1454 ft, or 443.2 m.
7. Answers will vary.

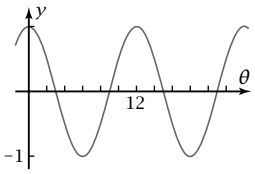
Chapter 3 • Applications of Trigonometric and Circular Functions

Exploration 3-1a

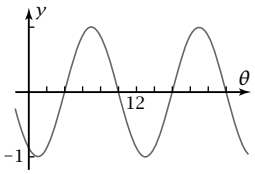
1. Use December's temperatures for month 0.



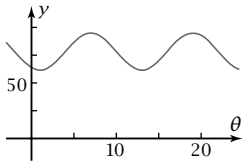
2. θ-dilation of $\frac{12°}{360°} = \frac{1}{30}$; $y = \cos 30\theta$



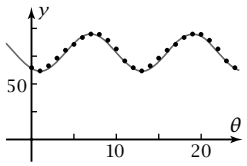
3. In Problem 1, the θ-dilation is $\frac{12°}{360°} = \frac{1}{30}$. Here the t-dilation (if t represents time in months) is $\frac{12 \text{ months}}{360°} = \frac{1}{30}$ months/degree, so $y = \cos 30t$
4. θ-translation of +7°; $y = 30 \cos(\theta - 7)$



5. $y = 78.3 + \cos 30(\theta - 7°)$
6. $y = 78.3 + 16.6 \cos 30(\theta - 7°)$. Actually, this should be $y = 78.3 + 16.6 \cos 30(t - 7)$, where t is time in months.



7. The fit is only shown for the first year. The second year is the same. The fit is good but not perfect.



8. Answers will vary.

Exploration 3-1b

1.

X	Y_1	X	Y_1
0	0	180	0
10	.17	270	−1
20	.34	360	0
30	.5	450	1
40	.64	540	0
50	.77	630	−1
60	.87	720	0
70	.94		
80	.98		
90	1