



It's Getting Hot Out Here!



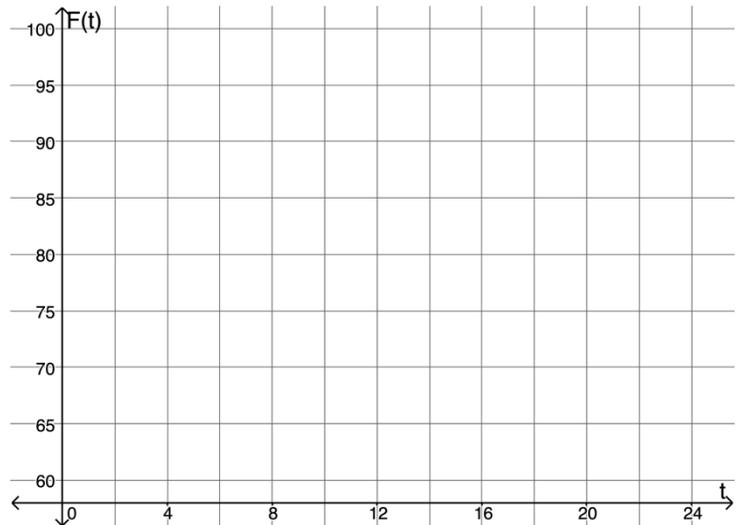
Karissa records the temperature, in °Fahrenheit, outside her house during a 24-hour period. The lowest temperature of the day was 70° and was recorded at $t = 0$ and again 24 hours later. The highest temperature of the day was 90° . Let $F(t)$ represent the temperature, in °Fahrenheit, after t hours. F can be modeled with a sinusoidal function.

1. Determine the range and amplitude of F . What do these values mean in the context of this problem?

2. Sketch the graph of F .

3. What would you estimate to be the average temperature on this day?
How do you know?

4. Would it make sense for $t = 0$ to represent midnight? Why or why not?



5. What is the period of F ? How do you know?

6. A model for $F(t)$ can be written in the form $F(t) = a\cos(bt) + d$. Find the values of a , b , and d .

7. Use your model to predict the temperature at $t = 8$.

8. Imagine if we used this model to predict the temperature over a 48-hour period. Describe what the model predicts would happen on day 2 ($24 \leq t \leq 48$). Do you think this is reasonable? Why or why not?

9. An alternate model for $F(t)$ is given by $F(t) = a\sin(b(t - c)) + d$. Find the value of c .

Lesson 6.7 – Modeling with Trigonometric Functions

QuickNotes

Check Your Understanding

Patty decides to ride the Ferris wheel at the amusement park. Her distance above the ground (in feet) after t minutes is given by $y(t) = -20 \cos\left(\frac{\pi t}{4}\right) + 23$.

1. Explain why it makes sense that her distance is modeled by a sinusoidal function.
2. Estimate her height above the ground after 5.5 minutes.
3. What is the maximum height that Patty is ever off the ground? What is the minimum height that she is ever off the ground (and why is it not 0)?
4. What is the diameter of the Ferris Wheel? How do you know?
5. How long does it take the Ferris wheel to make one complete revolution?