

# School-to-Career Activity

(Use with Lesson 11-3)

## Outdoor Nursery Operator

Suppose you operate an outdoor nursery and garden center near Raleigh, North Carolina. You are planning to grow a new type of ornamental shrub. After researching the shrub, you find that it grows best if planted when the average daily high temperature is  $66^{\circ}\text{F}$  or more. You also learn that during the first two years of growth, the shrub should be shaded from direct sunlight when exposed to daily high temperatures exceeding  $90^{\circ}\text{F}$ .

An agricultural consultant has given you the quadratic function

$$f(t) = -0.00186t^2 + 0.741t + 7.836,$$

which models the average daily high temperature in degrees Fahrenheit for Raleigh between March 15 and October 15. In the model,  $t$  represents the number of days since January 1. Assume that the model applies to a non-leap year.



1. According to the model, what is the earliest date that you could plant the shrubs? (Round to the nearest whole number).

**April 18 ( $t = 108$ )**

2. If you decide to delay planting the shrubs until the average daily high temperature reaches  $70^{\circ}\text{F}$ , when should you plant them?

**April 30 ( $t = 120$ )**

3. Does the model indicate that you should be prepared to shade the shrubs at any time after the shrubs have been planted? Explain your reasoning.

**The maximum daily high temperature given by the function is approximately  $81.6^{\circ}\text{F}$ . The model indicates that shading the shrubs won't be necessary because the daily high temperature will not rise above  $90^{\circ}\text{F}$ .**

4. Why might it be a good idea to be prepared to shade the shrubs regardless of the model?

**Mathematical models tend to represent average behavior. Because temperatures fluctuate a great deal, it is still quite possible for the temperature to climb above  $90^{\circ}\text{F}$ .**