Exercise 26

For the following exercises, consider this scenario: The number of people afflicted with the common cold in the winter months steadily decreased by 205 each year from 2005 until 2010. In 2005, 12,025 people were afflicted.

Find a reasonable domain and range for the function C.

Solution

Because the number of people that have a cold decreases steadily, a linear function can be used to model it. The slope is -205, the rate at which the number of people that have a cold increases. The initial number of people that have a cold is 12,025.

$$C(t) = -205t + 12\,025$$

The given rate is only valid from 2005 to 2010, so the domain is $0 \leq t \leq 5$. Evaluate C at the endpoints to determine the lowest and highest values the function takes.

$$C(0) = -205(0) + 12\,025 = 12\,025$$

$$C(5) = -205(5) + 12\,025 = 11\,000$$

Therefore, the range is $11\,000 \leq C \leq 12\,025$.