

## Exercise 22

The number of people afflicted with the common cold in the winter months dropped steadily by 25 each year since 2002 until 2012. In 2002, 8,040 people were afflicted. Find the linear function that models the number of people afflicted with the common cold  $C$  as a function of the year,  $t$ . When will less than 6,000 people be afflicted?

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### Solution

Because the number of people with a cold decreases at a constant rate, a linear function can be used to model the number of people with a cold. Let  $t$  be the number of years after 2002.

$$y = mt + b$$

$b$  is the number of people that had a cold in 2002.

$$y = mt + 8040$$

$m$  is the rate that the number of people with a cold increases.

$$y = -25t + 8040$$

To find when less than 6,000 people will have a cold, solve the following inequality.

$$y < 6000$$

$$-25t + 8040 < 6000$$

$$-25t < -2040$$

$$t > \frac{2040}{25}$$

$$t > \frac{408}{5} = 81.6$$

Therefore, after the middle of 2083 the number of people with a cold will be less than 6000.