

In 2004, the number of drive-in movie sites in the United States was 402. The number has been decreasing by about 21.9 sites per year since then. Let  $n$  be the number of drive-in movie sites at  $t$  years since 2004.

- **Clearly define your variables and identify the independent and dependent variables. While the book doesn't ask you to do this, it's a good idea to define your variables and determine which is the independent one and which is the dependent one before you do anything else.**

*Let  $t$  = years since 2004 (independent - like  $x$ )*

*Let  $n$  = number of drive-in movie sites in the US (dependent - like  $y$ )*

- a) Is there an approximate linear relationship between  $t$  and  $n$ ? Explain. If the relationship is approximately linear, find the slope and describe what it means in this situation.

*The words "decreasing by about 21.9 sites per year" implies a constant change - this means the relationship is linear.*

*That phrase is also the slope. It translates to -21.9*

*Slope = -21.9*

*The slope means that every year (because the denominator of the slope is 1), the number of drive-in movies sites in the US decreases by 21.9.*

- b) What is the  $n$ -intercept of the model? What does it mean in this situation?

*$n$ -int = (0, 402)*

*This means that in 2004, there were 402 drive-in movie sites in the US.*

- c) Find the equation of the model.

*$n = -21.9t + 402$*

- d) Predict the number of sites in 2011. **Round to the nearest integer if needed.**

*2011 means  $t = 7$ . Plug in 7 for  $t$  and solve.*

*$n = -21.9(7) + 402$*

*$n = 247.7$*

*In 2011, there will be 248 drive-in sites in the US.*

- e) Predict the number of sites in 2024. **Round to the nearest integer if needed.**

*2024 means  $t = 20$ . Plug in 20 for  $t$  and solve.*

*$n = -21.9(20) + 402$*

*$n = -36$*

*In 2024, there will be -36 drive-in sites in the US!!! This does not make sense - the model has broken down.*