

Group Quiz 9 Chapter 5

1. Algebraically solve the following equation: $50 = 2^x$. Give your answer rounded to three decimal places.
2. Algebraically solve the following equation: $2(6)^x - 17 = 3$. Give your answer rounded to three decimal places.

3. Let $f(t)$ represent the number of Starbucks stores at t years since 1980. (See table:)

Year	Years since 1980, t	Number of Stores, $f(t)$
1987		17
1989		55
1991		116
1993		272
1995		676
1997		1412
1999		2135
2001		4709

The data is approximately exponential, and a model that fits pretty well is $f(t) = 1.46(1.48)^t$. Answer the following using this model:

- The model is in the form $f(t) = ab^t$. What is the value of a ? What does it mean in terms of the situation?
- What is the base b ? What does it mean in terms of the situation?
- According to the model, how many Starbucks are there this year?
- Use f to predict when there will be an average of 1000 Starbucks stores in every state.
- Use f to predict when there will be one Starbucks store for every household in the U.S. Assume that there are 105 million households in the United States.

4. A person drinks alcohol at a party. After her last drink, the alcohol level of her blood soon reaches a maximum of 0.28 milligram alcohol per milliliter of blood. If the half-life of alcohol in her blood is 2 hours, how long must she wait before driving at the legal limit of 0.08 milligram alcohol per milliliter of blood? (Note: There is no safe way to drive after drinking. Even one drink can make you an unsafe driver. Also, the half-life of alcohol in a person's blood can vary by body type, sex, health status, and other factors.)