

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:

- (a) 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?
- (b) What is the base  $b$ ? What does it mean in terms of the situation?
- (c) According to the model, how many Starbucks are there this year?
- (d) Use  $f$  to predict when there will be an average of 1000 Starbucks stores in every state.
- (e) 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.)