Z-Score Questions: Vartanian

Assume a normal distribution in all of the questions below.

1. You got an 85 on the exam. The mean score for the class is 75 and the standard deviation is 10. What percentage of cases did worse than you? What percentage of cases did better than you?

2. You got a 95 on the exam. The mean for the class is 80. The standard deviation is 10. What proportion of the class did better than you? Did worse than you?

3. Your income is $20,000. The mean for the class is $30,000 while the standard deviation is $7,000. What proportion of the class has higher income than you? What proportion has lower income than you?

4. You take 4 vitamin pills a day to make sure that you stay healthy. The average person takes 1 vitamin pill a day, and the standard deviation for taking vitamin pills is 1. What percent above the mean are you?

5. You read 20 pages of your book each day. On average, people read 50 pages of their books each day. The standard deviation for pages of books read is 12. At what percentile are you in pages read per day?

1. $z = \dfrac{85-75}{10} = \dfrac{10}{10} = 1$, or you are 1 standard deviation unit above the mean. In other words, you are 34.13% above the mean, or you=re at the 84.13rd percentile (50+34.13). 15.87% of the class did better than you.

2. $z = \dfrac{95-80}{10} = \dfrac{15}{10} = 1.5$, or you are 1.5 standard deviation units above the mean. In other words, you are 43.32% above the mean, or you=re at the 93.32nd percentile (50+43.32). 6.68 percent of the class did better than you.

3. $z = \dfrac{20,000-30,000}{7,000} = \dfrac{-10,000}{7,000} = -1.43$, or you are 1.43 standard deviation units below the mean. In other words, you are 42.36 percent below the mean, or you=re at the 7.64th percentile (50-42.36). 82.36 percent of the class did better than you.

4. $z = \dfrac{4-1}{1} = \dfrac{3}{1} = 3$, or you are 3.00 standard deviation units above the mean. You are at the 99.87th percentile. .13% of the class did better than you.

5. $z = \dfrac{20-50}{12} = \dfrac{-30}{12} = -2.50$, or you are 2.50 standard deviation units below the mean. In other words, you are 49.38% below the mean, or you are at the .62%. 99.38% are above you.