

Psyc 3101, Homework 4

Name: _____ TA: _____ Lab Day and Time: _____

Please fill out all three lines above. Otherwise we can't easily record your scores.

Your 3-year-old niece has a vocabulary of 500 words, which gives her a z-score of +1 for kids her age. Your neighbor's kid has a vocabulary of 200 words and a z-score of -2.

1. What's the standard deviation?
2. What's the mean?

A z-table gives the probability of a z-score greater than each listed value, in a normal distribution. People used these before computers, and there's one in the back of your textbook. Here's a z-table:

z	p(Z≥z)	z	p(Z≥z)	z	p(Z≥z)	z	p(Z≥z)
0	?	.5	.309	1.0	.159	1.5	.067
.1	.460	.6	.274	1.1	.136	1.6	.055
.2	.421	.7	.242	1.2	.115	1.7	.045
.3	.382	.8	.212	1.3	.097	1.8	.036
.4	.345	.9	.184	1.4	.081	1.9	.029

3. What value belongs in the question mark?
4. What's the probability of a z-score greater than -1?
5. What's the probability of a z-score between .5 and 1?
6. When you get off an international flight to Singapore, they take your temperature and if it's over 39° C they quarantine you to keep diseases out of the country. Of course even healthy people have natural variability in temperature, following a normal distribution with mean 37° and standard deviation 2.5°. What percentage of healthy people are mistakenly quarantined?

A lottery ticket can pay \$5 or \$100, or it can pay nothing. The probability of winning \$5 is 1 in 10. The probability of winning \$100 is 1 in 100.

7. What is the probability of a ticket paying nothing?
8. What is the expected value of how much a ticket will pay?
9. If the state sells a million tickets at \$1 each, about how much profit will it make?
10. Calculate the variance of {11, 18, 21, 14, 9, 15}, treated as a population.
11. Calculate the variance of the same numbers, treated as a sample. Try to use a shortcut based on your previous answer.
12. A population has a variance of 8. Imagine you collect a large number of independent samples, each with 30 subjects, and compute the sample variance of each sample. What would you expect the average of your sample variances to be?