

Homework #4 – Due Thursday, Aug. 2
STAT-UB.0001 – Statistics for Business Control

Problem 1

Find the probability that a standard normal random variable is:

- (a) Greater than zero
- (b) Greater than -1.4
- (c) Less than -0.7
- (d) Between -1 and 2
- (e) Less than -0.5 or greater than 1.7
- (f) Equal to 1 .

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Problem 2

Find a value of a standard normal random variable Z (call it z_0) such that

- (a) $P(Z < z_0) = .30$
- (b) $P(Z > z_0) = .16$
- (c) $P(-z_0 < Z < z_0) = .90$

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Problem 3

Suppose that X is normally distributed with mean 11 and standard deviation 2 . Find

- (a) $P(10 < X < 12)$
- (b) $P(X > 7.6)$.

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Problem 4

A Pepsi machine in a Burger King store can be regulated so that it dispenses an average of μ ounces per cup. If the amount dispensed is normally distributed with standard deviation 0.3 ounces, what should be the setting for μ so that 8 -ounce cups will overflow only 1% of the time?

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Problem 5

Suppose that annual stock returns for a particular company are normally distributed with a mean of 18% and a standard deviation of 6%. You are going to invest in this stock for one year. (Note: In reality, annual returns tend to be more nearly normally distributed than daily returns.) Find that the probability that your one-year return will exceed 26%.

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Problem 6

If the population standard deviation is 2.5 and we take a random sample of size 81, what is $sd(\bar{X})$? Note: this quantity is known as the “standard error of the mean.”

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Problem 7

Suppose that daily returns on a portfolio are independent, with a mean of 0.03% and a standard deviation of 1%. Approximately what is the probability that the average daily return over the next 100 days will be between 0.2% and 0.3%?

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Problem 8

If we throw n dice where n is large, why can we think of the distribution of the sum as being approximately normal?

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Problem 9

Suppose that an auto factory has 8 assembly lines, operating independently. For each assembly line, the number of autos produced per day has a normal distribution with mean of 20 and a standard deviation of 4. Approximately what is the probability that 120 or fewer autos will be produced tomorrow?

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