Problem 1

Find the probability that a standard normal random variable is:

(a) Greater than zero

(b) Greater than -1.5

(c) Less than -0.3

(d) Between -2 and 1

(e) 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) $P(Z < z_0) = .20$

(b) $P(Z > z_0) = .025$

(c) $P(-z_0 < Z < z_0) = .84$

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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 0.2 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 16% and a standard deviation of 10%. 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 30%.

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Problem 6

If the population standard deviation is 2.3 and we take a random sample of size 64, what is $\text{sd}(\bar{X})$? 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 10 assembly lines, operating independently. For each assembly line, the number of autos produced per day has a mean of 20 and a standard deviation of 3. Approximately what is the probability that 180 or fewer autos will be produced tomorrow?

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