

1. Joe answers the questions on a multiple-choice test by guessing randomly. Each question has 5 possible answers. What is the probability that the first question he guesses correctly is the 5th question?
2. During rush hour, on average 3 buses pass by a certain bus stop every 15 minutes.
 - (a) What is the probability that fewer than 2 buses will pass by this stop in 15 minutes during rush hour?
 - (b) What is the probability that it will be more than 6 minutes until the next bus arrives during rush hour?
3. 5% of the flash drives coming off a certain assembly line will fail within 10 hours of use. Suppose we look at 20 flash drives produced by this assembly line.
 - (a) What is the probability that no more than one of the 20 flash drives will fail within 10 hours?
 - (b) Check whether the conditions hold to estimate this probability by the Poisson distribution.
 - (c) Estimate the binomial probability by the Poisson distribution.
 - (d) Find the percentage error made in estimating by the Poisson distribution.
 - (e) Check whether the conditions hold to estimate this probability by the normal distribution.
 - (f) Estimate the binomial probability by the normal distribution.
 - (g) Find the percentage error made in estimating by the normal distribution.
4. Find the values of the gamma function:
 - (a) $\Gamma(7)$
 - (b) If $\Gamma(\frac{1}{2}) = \sqrt{\pi}$, what is $\Gamma(\frac{3}{2})$?
5. Find $Z_{.025}$; that is, find Z which cuts off a right-hand tail probability 0.025.
6. The weight of coffee in an 8-ounce can of Maria's Best Coffee has normal distribution with mean 8.00 ounces and standard deviation 0.25 ounces.
 - (a) What is the probability that a randomly selected can of this coffee contains less than 7.50 ounces of coffee?
 - (b) What is the probability that the can contains between 7.50 and 8.50 ounces of coffee?
 - (c) If we take a random sample of 25 of these cans of coffee, what is the probability that the mean weight of the coffee in those cans will be less than 7.90 ounces?
7. The amount of iron in a large egg is normally distributed with standard deviation 0.3 mg. We take a sample of 50 large eggs and measure the amount of iron they contain. The mean amount of iron per egg in our sample is 4 mg. Find a 98% confidence interval for the mean amount of iron in large eggs.