Tutorial 3

Simple Practice Problems

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1. Binomial Distribution Problem A coin is flipped 5 times. What is the probability of getting exactly 3 heads?
Hint: Use binopdf(k, n, p) where k=3, n=5, and p=0.5.

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2. Gaussian (Normal) Distribution Problem The scores on a math test are normally distributed with a mean of 70 and a standard deviation of 10. What is the probability that a randomly selected student scores less than 65?
Hint: Use normcdf(x, mu, sigma).

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3. Poisson Distribution Problem A library sees an average of 2 people arriving every 10 minutes. What is the probability of having exactly 4 people arriving in the next 10 minutes?
Hint: Use poisspdf(k, lambda) where k=4 and λ=2.

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4. Bernoulli Distribution Problem A light switch has a 90% chance of being on. If you check the light once, what is the probability that it is off?
Hint: Use $1-p$, where p=0.9.

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5. PMF Problem A die is rolled once. What is the probability of rolling a 4?
Hint: For a fair die, the probability is 1/6.

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6. PMF and CDF Problem for Binomial Distribution A survey finds that 60% of people prefer online shopping over physical shopping. If you survey 8 people, plot the PMF and CDF of the number of people who prefer online shopping.
Hint: Use binopdf() and binocdf() to calculate the PMF and CDF, and plot using stem() and stairs().

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7. Gaussian Distribution Problem The temperature in a city on a given day is normally distributed with a mean of 30°C and a standard deviation of 5°C. What is the probability that the temperature is between 25°C and 35°C?
Hint: Use normcdf(x, mu, sigma) for both 25 and 35, and subtract the results.

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8. Simple Bayes' Theorem Problem A factory has two machines, A and B. Machine A produces 60% of the products, and Machine B produces 40%. 3% of the

products from Machine A are defective, while 5% of the products from Machine B are defective. If a product is found to be defective, what is the probability it came from Machine A?
Hint: Use Bayes' Theorem.

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9. Bernoulli Trial Simulation Simulate a single coin flip where the probability of getting heads is 0.6.
Hint: Use rand() and check if the random number is less than 0.6.

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10. Simple PMF and CDF Problem A random variable X represents the number on a fair die. Plot the PMF and CDF for X.
Hint: Use stem() for the PMF and stairs() for the CDF.