**Quiz on Probability, Statistics and Linear Algebra**

1. You flip a fair coin 10 times. You get 4 heads and 6 tails. What is the probability of getting a head on your next coin flip?
2. Given the distribution {-2, -1, 3, 3, 5, 6, 8, 10, 11}, what are the mean, median and standard deviation of the sample?
3. What is the value of the limit: lim x2 – x - 2

x2 x2 – 2x

a) 0 b) -1 c) 2 d) infinity e) the limit does not exist

1. The weatherman has predicted rain tomorrow. In recent years, it has rained only 73 days each year. When it actually rains, the weatherman correctly forecasts rain 70% of the time. When it does not rain, he incorrectly forecasts rain 30% of the time. What is the probability that it will rain tomorrow?
2. We are given that the probability density function (pdf) of a continuous random variable X is:

4x 0 ≤ x ≤ 0.5

*p(x)* =

-4x + 4 0.5 ≤ x ≤ 1

What is the equation for the corresponding cumulative density function (cdf) *P(x)?*

1. Consider the following system of equations:

2x1 + x2 + x3 = 3

4x1 + 2x3 = 10

2x1 + 2x2 = -2

Solve for x1, x2, and x3.

1. Consider the following matrix:

1 2 3

1 4 3

1 3 4

1. Is the matrix invertible?
2. What is the rank of the matrix?
3. The eigenvalues of the matrix A = 3 6

1 4

are λ = 6 and λ = 1. Which of the following is an eigenvector for λ = 1?

a. 0 b. -3 c. 3 d. 1

1 1 1 0

1. Find the determinant of A. 1 1 1 1

A = 1 4 4 4

1 4 9 9

1 4 9 16