Insurance Problems

A car insurance company sold 12,000 policies ($50,000 payout value) this year. The probability of an accident resulting in a claim for each policy is 0.002. The company charges $400 for each policy. Use the Poisson approximation to determine the following.

a) P(The company breaks even)

b) P(Company Profits $300,000 or more)

c) P(Company Loses $500,000 or more)

d) What value of λ would be used if the company charged $450 for each policy?

e) What value of λ would be used if the probability of an accident was 0.003?

95-5% Split – Binomial

Problem 1: We are going to toss a fair coin 13 times. Determine the "OK Bet" and "Cheater" Region for this.

If there were 7 Heads tossed, would you bet or not bet?

If the coin is fair is our above decision a theoretical error?

If so, will we eventually detect the error?

If the coin is a 70% coin is the above decision a theoretical error?

If so, will we eventually detect the error?

Determine the probability of detecting a p = 0.6, 0.7, and 0.8 cheater coin:

For individuals with Condition X, the level of enzyme Y in the blood is normally distributed with a mean of 75 and a standard deviation of 6. For individuals without Condition X, enzyme Y levels are normally distributed with a mean of 90 and a standard deviation of 3.

Draw the Chart:

a) At what enzyme Y level should the "Tested Positive for Condition X" threshold start so that only 0.005 of people with Condition X would test negative?

b) What would be the probability of a false positive (an individual without Condition X tests positive)?

c) A patient with Condition X has an enzyme Y level of 80. Will we properly diagnose that patient?

d) A patient with Condition X has an enzyme Y level of 85. Will we properly diagnose that patient?

e) A healthy patient has an enzyme Y level of 80. Will we properly diagnose that patient?

Tire Warranty Problem

Problem 1: The life of tires of a certain tire company is known to be normally distributed with a mean of 50,000 miles and a standard deviation of 2500 miles.

What is the probability that a randomly selected tire will last longer than 57,000 miles?

Do you think a randomly selected tire will last longer than 57,000 miles?

$P(47{,}500 < Tire\ Life < 52{,}500) =$

Problem 2: The life of tires of a certain tire company is known to be normally distributed with a mean of 65,000 miles and a standard deviation of 3000 miles.

What is the probability that a randomly selected tire will last longer than 73,250 miles?

Do you think a randomly selected tire will last longer than 73,250 miles?

$P(60{,}500 < Tire\ Life < 52{,}500) =$