**Problem Statement**

**Practical Application of CLT**

1. Engineers must consider the breadths of male heads when designing motorcycle helmets for men. Men have head breadths that are normally distributed with a mean of 6.0 inches and a standard deviation of 1.0 inch
2. If one male is randomly selected, what is the likelihood that his head breadth is less than 6.2 inches?

Here mean is 6 inch standard deviation is 1

So using formula of z score = 6.2-6/1 = 0.2 checking value of 0.2 in z table the value is 0.5793

1. The Safeguard Helmet company plans an initial production run of 100 helmets. How likely is it that 100 randomly selected men have a mean head breath of less than 6.2 inches?

Mean standard deviation = sd/sqrt of n

=1/sqrt of 100

= 0.1

Mean z value = 6.2-6/0.1 = 2

= 0.9772

1. The production manager sees the result in part b and reasons that all helmets should be made for men with head breadths of less than 6.2 inches, because they would fit all but a few men. What is wrong with that reasoning?

Ans of q1 shows that 0.57 means 57% male will have correct helmet

So 42% will have head breath greater than 6.2 so would not find helmet fit

**Two-tailed Test Of Population Mean With Known Variance**

1. Suppose the mean weight of King Penguins found in an Antarctic colony last year was 15.4 kg. In a sample of 35 penguins same time this year in the same colony, the mean penguin weight is 14.6 kg. Assume the population standard deviation is 2.5 kg. At .05 significance level, can we reject the null hypothesis that the mean penguin weight does not differ from last year?

Here mean is 15.4 kg

Sample n is 35

Sample mean is 14.6 kg

Population std d is 2.5 kg

So confidence level is 95%

So to reject the null hypothesis

Sample sd = s/sqrt of n

= 2.5/sqrt of 35

Z= -1.89

So we cannot reject the null hypothesis