Solution of Problem 1a :

In this problem,

Mean, µ = 6.0

Standard Deviation, σ = 1.0

We have to find Probability, P (x < 6.2)

6.2

3 4 5 6 7 8 9

If one male is randomly selected,

Z Score = ( x - µ ) / σ

= ( 6.2 – 6.0 ) / 1.0

= 0.2

Referring to Z table

P (x < 6.2) = P (6.2, µ , σ) = 0.5793

0.5793 is the likelihood that head breadth is less than 6.2 inches.

Solution to problem 1b**:**

Here,

n = 100

Mean, µ = 6.0

Standard Deviation, σ = 1.0

We have to find probability , P ( x̅ < 6.2)

Now,

Standard Error = σ / Sqrt of n

= 1 / Sqrt of 100

= 0.1

With Central Limit Theorem , Standard Deviation is equal to Standard error.

we have to find P ( 6.2 , µ , std. error)

Z Score = ( x̅ - µ ) / std. error

= ( 6.2 – 6.0 ) / 0.1

= 2.0

Referring to Z table

P (6.2, µ , std. error) = 0.9772

0.9772 is the likelihood that 100 randomly selected men have a mean breadth of less than 6.2 inch.

Solution to Problem 1c:

The result of part b above tells the like likelihood that 100 randomly selected men have a mean breadth of less than 6.2 inch.

If the production manager is targeting that helmet should fit for all the men and manufactures helmet for 6.2 inch head breadth the likelihood of fitting is 0.579.

Hence the reasoning given is wrong.

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Solution of Problem 2

Given

µ = 15.4 kg

s = 2.5 kg

n = 35

xbar = 14.6 kg

α= 0.05

H0 = mean population weight does not differ from last year

Test statistic , t = ( x bar - µ ) / [( s / sqrt of n)]

t = (14.6 – 15.4 ) / [ (2.5 /sqrt of 35 )]

t = -1.8931

Degrees of freedom = n-1

= 35 -1 = 34

Critical t = 2.034

The test statistic 1.8931 is less the critical values 2.034. That means there is no significant relationship.

Hence, at 0.05 significance level, we do not reject the null hypothesis that the mean penguin weight does not differ from last year.