Let,

Y=The monthly sales in $1000s(i.e. Response or dependent variable) i

X= The operational life in years (i.e. independent or explanatory variable)

We know that,

The the estimated least squares regression equation is ,

y^=b 0 + b 1 ×x

Where,

b o=The estimate of the y-intercept &

b 1 =The estimate of the slope

Given that,

sample size, n=15

significance level,  α =0.01 i.e. 1%

 ∑xi=122 ,

Sxx=1462 (sum of squares of x)

b0 =11.75 and b1 =0.662 , s=4.45646

Therefore, the estimated least squares linear regression equation is ,

 y^=11.75+0.662×x

Here we have to estimate the upper prediction limit of the monthly sales in dollars, of all salespersons with 10 years of experience with a 99% confidence level,

when x=10

We know that,

A 100 (1−α)%  upper prediction interval for the future observation yo is

haty0+t alpha/2,n-2\*s\sqrt{(1+{1}/{n}+{(x0-barx)^2}/{Sx x})}

Here,

 α=0.01 , n=13

 tα2,n−2=t0.012,13=3.0123

Therefore , the required confidence interval is,

haty0+t alpha/2,n-2\*s\sqrt{(1+{1}/{n}+{(x0-barx)^2}/{Sx x})}

18.37+3.0123\*4.45646\sqrt{(1+{1}/{15}+{(10-8.1333)^2}/{1462})}

Explanation: Here t degrees of freedom =n-2 i.e. 13

By using the t-critical value table

**The upper prediction limit of the monthly sales in dollars, of all salespersons with 10 years of experience with a 99% confidence level is**

**32.2499 i.e. 32.2 ($1000)**