Multiple linear regression

Aim : Model fitting and investigation of relationships between more than two variables within a regression framework.

Probem 1:

Y : sale of products in lakhs

X1 : Advertising expenditiure in thousands

X2 : Number of sales person

Area	Y	X1	X2
1	110	30	11
2	80	40	10
3	70	20	7
4	120	50	15
5	150	60	19
6	90	40	12
7	70	20	8
8	120	60	14

```
> Y = c(110, 80, 70, 120, 150, 90, 70, 120)
> X1 = c(30, 40, 20, 50, 60, 40, 20, 60)
> X2 = c(11, 10, 7, 15, 19, 12, 8, 14)
> df = data.frame(Y, X1, X2)
> df
    Y X1 X2
1 110 30 11
2  80 40 10
3  70 20  7
4 120 50 15
5 150 60 19
6  90 40 12
7  70 20  8
8 120 60 14
> View(df)
> View(df)
> View(df)
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> regmodel<-lm(Y~X1+X2, data=df)
> regmodel

Call:
lm(formula = Y ~ X1 + X2, data = df)
```

Coefficients:

(Intercept)	X1	X2
16.8314	-0.2442	7.8488

Poisson and normal distribution

Aim : Computing, plotting and visualizing Poisson and Normal distribution

Problem 1 : Compute P(x=5) labda =7

```
> p5 = dpois(x=5, lambda = 7)
> p5
[1] 0.1277167
```

Problem 2 : Compute P(x=5), P(x=4),…,P(x=0) labda =7

```
> p6 = dpois(x=0:5, lambda = 7)
> p6
[1] 0.000911882 0.006383174 0.022341108 0.052129252 0.091226192 0.127716668
```

>

Problem 3 : P(x<=5), lamba=7

```
> p7 = sum(dpois(x=0:5, lambda = 7))
> p7
[1] 0.3007083
```

Problem 4 : P(x>5), lamba=7

```
> p6 = ppois(q=5, lambda = 7, lower.tail = FALSE)
> p6
[1] 0.6992917

> p7 = round(ppois(q=5, lambda = 7, lower.tail = FALSE), 4)
> p7
[1] 0.6993
```

Problem 5 : Check the relation between mean and variance in Poisson distribution with lamba=4, and n=100

```
> X.val = 0:100
> P.val = dpois(X.val, 4)
> mean1 = sum(X.val*P.val)
> mean1
[1] 4
> var = sum((X.val-mean1)^2*P.val)
> var
[1]
```

Problem 6 : Compute probability and cumulative probability for values in 0 to 10 with parameter 2.

```
> X = 0:10
> cdf = ppois(q=0:10, lambda = 2, lower.tail = TRUE)
> cdf
 [1] 0.1353353 0.4060058 0.6766764 0.8571235 0.9473470 0.9834364 0.9954662 0.9989033
 [9] 0.9997626 0.9999535 0.9999917
> pdf1 = dpois(x=0:10, lambda = 2)
> pdf1
 [1] 1.353353e-01 2.706706e-01 2.706706e-01 1.804470e-01 9.022352e-02 3.608941e-02
 [7] 1.202980e-02 3.437087e-03 8.592716e-04 1.909493e-04 3.818985e-05
```

Problem 7 : lamba = 12, P(X>=17)

```
> p = ppois(q=16, 12, lower.tail = FALSE)
> p
[1] 0.101291
```