Calculate probability from the given dataset for the below cases

Data _set: Cars.csv

Calculate the probability of MPG of Cars for the below cases.

MPG <- Cars$MPG

a. P(MPG>38)

b. P(MPG<40)

c. P(20<MPG<50)

In [4]:

```
import pandas as pd
import numpy as np
from scipy import stats
from scipy.stats import norm
```

In [6]:

```
cars_data = pd.read_csv('Cars.csv')
cars_data
```

Out[6]:

	HP	MPG	VOL	SP	WT
0	49	53.700681	89	104.185353	28.762059
1	55	50.013401	92	105.461264	30.466833
2	55	50.013401	92	105.461264	30.193597
3	70	45.696322	92	113.461264	30.632114
4	53	50.504232	92	104.461264	29.889149
...	...	...	...	...	...
76	322	36.900000	50	169.598513	16.132947
77	238	19.197888	115	150.576579	37.923113
78	263	34.000000	50	151.598513	15.769625
79	295	19.833733	119	167.944460	39.423099
80	236	12.101263	107	139.840817	34.948615

81 rows × 5 columns

In [7]:

```
cars_data.isna().sum()
```

Out[7]:

```
HP     0
MPG    0
VOL    0
SP     0
WT     0
dtype: int64
```

In [8]:

```
cars_data.describe()
```

Out[8]:

	HP	MPG	VOL	SP	WT
count	81.000000	81.000000	81.000000	81.000000	81.000000
mean	117.469136	34.422076	98.765432	121.540272	32.412577
std	57.113502	9.131445	22.301497	14.181432	7.492813
min	49.000000	12.101263	50.000000	99.564907	15.712859
25%	84.000000	27.856252	89.000000	113.829145	29.591768
50%	100.000000	35.152727	101.000000	118.208698	32.734518
75%	140.000000	39.531633	113.000000	126.404312	37.392524
max	322.000000	53.700681	160.000000	169.598513	52.997752

Probability where P(MPG>38)

based on data x is 38 , mean (loc) is 34.422076 , std (scale) is 9.131445

In [12]:

```
x=1-stats.norm.cdf(x=38,loc=34.422076,scale=9.131445 )
print("The Probability where MPG is greater than 38 is",x )
```

```
The Probability where MPG is greater than 38 is 0.34759394041453007
```

Probability where P(MPG<40)

based on data x is 40 , mean (loc) is 34.422076 , std (scale) is 9.131445

In [20]:

```
x=stats.norm.cdf(x=40,loc=34.422076,scale=9.131445 )
print("The Probability where MPG is Less than 40 is",x )
```

```
The Probability where MPG is Less than 40 is 0.7293498604157946
```

Probability where P(20<MPG<50)

based on data x is 20 and 50, mean (loc) is 34.422076 , std (scale) is 9.131445

In [17]:

```
x=stats.norm.cdf(x=0.50,loc=34.422076,scale=9.131445 )- stats.norm.cdf(x=0.20,loc=34.42
print("The Probability where MPG is Less than 40 is",x )
```

```
The Probability where MPG is Less than 40 is 1.2430972133282213e-05
```

In [ ]:

```

```