

```
In [35]: from scipy import stats
import numpy as np
from scipy.stats import norm
```

## Q. 1 Answer

```
In [13]: stats.norm.cdf(x=50,loc=45,scale=8) #To finish work less than 50 minutes probability would be 73.4% or 0.734
```

```
Out[13]: 0.7340144709512995
```

```
In [15]: 1 - stats.norm.cdf(x=50,loc=45,scale=8) #26.6% or 0.2676
```

```
Out[15]: 0.26598552904870054
```

## Q. 2A Answer

```
In [6]: #Probability that employees age is Less than 44 years is 84.13%
stats.norm.cdf(x=44,loc=38,scale=6)
```

```
Out[6]: 0.8413447460685429
```

```
In [7]: # Probability that employees age is Greater than 44 years is 15.86%
1 - stats.norm.cdf(x=44,loc=38,scale=6)
```

```
Out[7]: 0.15865525393145707
```

```
In [8]: #Probability that employees age is Greater than 38 years is 50.0%
stats.norm.cdf(x=38,loc=38,scale=6)
```

```
Out[8]: 0.5
```

```
In [9]: #Probability that No. of employees between 38 and 44 years is 34.13%
stats.norm.cdf(x=44,loc=38,scale=6) - stats.norm.cdf(x=38,loc=38,scale=6)
```

```
Out[9]: 0.3413447460685429
```

```
In [ ]: # A Statement is TURE.
```

## Q. 2B Answer

```
In [10]: #Probability that employees age is Less than 30 years is 9.12%
stats.norm.cdf(x=30,loc=38,scale=6)
```

```
Out[10]: 0.09121121972586788
```

```
In [11]: 0.09121121972586788*400 # Out of 400 clerical employees, 36 employees will be attracted for employees under the age of 30.
```

```
Out[11]: 36.484487890347154
```

```
In [16]: # B Statement is TURE.
```

## Q.5 Answer

```
In [34]: # Mean profits from two divisions of company = Mean 1 + Mean 2 = 5 + 7
Mean = 5 + 7
print('Mean Profit is found Rs.', Mean*45,'Million')
```

```
Mean Profit is found Rs. 540 Million
```

```
In [36]: #Variance of profits from two divisions of a company = SD1^2 + SD2^2
std_dev = np.sqrt((9)+(16))
print('SD is Rs.', std_dev*45,'Million')
```

```
SD is Rs. 225.0 Million
```

```
In [ ]: ## A.Specify a Rupee range (centered on the mean) such that it contains 95% probability for the annual profit of the company.
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```
In [37]: stats.norm.interval(alpha=0.95, loc=540, scale=225)
```

```
Out[37]: (99.00810347848784, 980.9918965215122)
```

```
In [38]: ## B.Specify the 5th percentile of profit (in Rupees) for the company
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In [42]: #For 5th Percentile, By using formula  $X = \mu + Z\sigma$  (from z table, 5th % value is = -1.645)
X= 540+(-1.645)*(225)
np.round(X,)
```

```
Out[42]: 170.0
```

```
In [43]: ## C.Which of the two divisions has a larger probability of making a loss in a given year?
```

```
In [44]: stats.norm.cdf(0,5,3) # Probability of Company Division-1 making a Loss is  $P(X < 0)$ 
```

```
Out[44]: 0.0477903522728147
```

```
In [45]: stats.norm.cdf(0,7,4) # Probability of Company Division-2 making a Loss is  $P(X < 0)$ 
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Out[45]: 0.040059156863817086
```

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