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In [1]: import numpy as np
        from scipy import stats
        from scipy.stats import norm
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In [2]: # Mean profits from two different divisions of a company = Mean1 + Mean2
        Mean = 5+7
        print('Mean Profit is Rs', Mean*45, 'Million')
```

Mean Profit is Rs 540 Million

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In [3]: # Variance of profits from two different divisions of a company = SD^2 = SD1^2 + SD2^2
        SD = np.sqrt((9)+(16))
        print('Standard Deviation is Rs', SD*45, 'Million')
```

Standard Deviation is Rs 225.0 Million

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In [4]: # A. Specify a Rupee range (centered on the mean) such that it contains 95% probability
        print('Range is Rs',(stats.norm.interval(0.95,540,225)), 'in Millions')
```

Range is Rs (99.00810347848784, 980.9918965215122) in Millions

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In [5]: # B. Specify the 5th percentile of profit (in Rupees) for the company
        # To compute 5th Percentile, we use the formula  $X = \mu + Z\sigma$ ; wherein from z table,  $Z = -1.645$ 
        X= 540+(-1.645)*(225)
        print('5th percentile of profit (in Million Rupees) is',np.round(X,))
```

5th percentile of profit (in Million Rupees) is 170.0

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In [6]: # C. Which of the two divisions has a larger probability of making a loss in a given year?
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In [7]: # Probability of Division 1 making a Loss  $P(X < 0)$ 
        stats.norm.cdf(0,5,3)
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Out[7]: 0.0477903522728147

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In [8]: # Probability of Division 2 making a Loss  $P(X < 0)$ 
        stats.norm.cdf(0,7,4)
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Out[8]: 0.040059156863817086

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In [ ]:
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