Q5. Consider a company that has two different divisions. The annual profits from the two divisions are independent and have distributions Profit1 ~ N(5, 32) and Profit2 ~ N(7, 42) respectively. Both the profits are in Million. Answer the following questions about the total profit of the company in Rupees. Assume that 1dollar = Rs. 45

- Specify a Rupee range (centered on the mean) such that it contains 95% probability for the annual profit of the company.
- Specify the 5th percentile of profit (in Rupees) for the company
- Which of the two divisions has a larger probability of making a loss in a given year?

In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
```

In [1]:
```
#mean profit of two divisions of company
mean = 5+7   #m1 + m2
print('Mean Profit is', mean*45,'million')
```

```
Mean Profit is 540 Million
```

In [ ]:
```
# 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')
```

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

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

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

In [ ]:
```
# Probability of Division 1 making a loss P(X<0)
stats.norm.cdf(0,5,3)
```

In [ ]:
```
# Probability of Division 2 making a loss P(X<0)
stats.norm.cdf(0,7,4)
```