In [1]:

```python
import numpy as np
from scipy import stats
from scipy.stats import norm
```

In [2]:

```python
# Mean profits from two different divisions of a company = Mean 1 + Mean 2
Mean = 5+7
Mean*45
```

Out[2]:

540

In [4]:

```python
# Variance of profits from two different divisions of a company = SD^2 = SD1^2 + SD2^2
SD = np.sqrt((9)+(16))
SD*45
```

Out[4]:

225.0

A. Specify a Rupee range (centered on the mean) such that it contains 95% probability for the annual profit of the company.

In [6]:

```python
Range = stats.norm.interval(0.95,540,225)
Range
```

Out[6]:

(99.00810347848784, 980.9918965215122)

B. Specify the 5th percentile of profit (in Rupees) for the company

In [9]:

```python
# To compute 5th Percentile, we use the formula X=μ + Zσ; wherein from z table, 5 percentil
X=540+(-1.645)*225
X
```

Out[9]:

169.875

C. Which of the two divisions has a larger probability of making a loss in a given year?

In [10]:

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

Out[10]:

0.0477903522728147

In [12]:

```python
# Probability of Division 1 making a loss P(X<0)
stats.norm.cdf(0,7,4)
```

Out[12]:

0.040059156863817086

Probability of Division 1 making a loss in a given year is more than Division 2.