

# **Management Accountancy**

Unit 5

## **Cost Volume Profit Analysis Under Condition of Uncertainty**

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# Contents

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- CVP analysis under condition of uncertainty

# Learning Objectives

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- Apply CVP analysis under condition of uncertainty

# CVP Analysis Under Condition of Uncertainty

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- The major short comings of cost-volume-profit (CVP) analysis is not adjust for risk and uncertainty
- Risk and uncertainty are a part of business decision making
  - Future is always uncertain
- However, it has been found that traditional cost-volume-profit analysis ignores risk and uncertainty
- The traditional CVP assumes that price, cost, profit and sales are known with certainty
- All price, cost, profit and sales are uncertain for future
  - Sales units are more uncertain component in comparison to price and cost
  - Price and cost are within the control of management to some extent

# Decision Situation with Reference to Risk Analysis

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- **Certainty**

- If the future estimates are certain, they can be forecast precisely with cent percent accuracy
- There will be no risk in such a situation
- This condition is generally known as certainty

- **Uncertainty**

- When the future outcome cannot be predicted with any degree of confidence from a knowledge of past or existing events, that is known as uncertainty.

- **Risk**

- It occurs where it is not known what the future outcome will be, but where the various possible outcomes may be expected with some degrees of confidence from a knowledge of past or existing events.
- Though the meaning of risk and uncertainty seems to be different, these two terms are used interchangeably.

# Risk Analysis Techniques Applied in CVP Analysis

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- Probability Distribution
- Standard Deviation of Random Variables
- Normal Distribution

# Probability Distribution

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- A manager has to make decision for future. However, future is uncertain.
- Probability plays an important role in decision making.
- A theoretical probability distribution is related to frequently distribution.
- It is generally used to make decision logically.
- It estimates the future values on the basis of limited information on theoretical consideration.
- Thus the probability distribution is to assign probability to different values.
- Those different values are the results of the outcome of a random experiment which is known as random variable.
- After assigning the probability to different values, the mean or the expected value of random variable is ascertained. The mean or expected value of random variable is the sum of the product of the different values of random variable and their respective probabilities. Symbolically, it is written as ' $\mu$ '.

# Probability Distribution

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Step 1	Multiply different estimated values by their respective probabilities.
Step 2	Sum the products of step 1, which is known as expected value.

- Mainly, there are four different factors in cost-volume-profit analysis.
- They are selling price, variable cost, fixed cost and sales units.
- All of these four factors are uncertain.
- However, variable cost, fixed cost and selling price are quite certain than sales units.
- Hence sales volume in units is treated as random uncertain variable

# Probability Distribution

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## Question

A company produces a single product with a sales price of Rs. 50 per unit and variable cost Rs. 30 per unit. Fixed costs are Rs. 30,000 per annum. The manager expects five different possible happening in the coming year, which are as follows:

Sales Units	Probability
1,000	0.2
1,500	0.1
2,000	0.3
2,500	0.3
3,000	0.1

- Required :
- (i) Break-even units
  - (ii) Expected sales unit (Mean sales units)
  - (iii) Expected profit

# Probability Distribution

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SOLUTION:

$$(i) \text{ Break-even Units} = \frac{\text{Fixed Cost}}{\text{Unit Contribution Margin}} = \frac{30,000}{50 - 30} = 1,500 \text{ units}$$

(ii) Calculation of Expected Sales Value:

<b>Sales Units</b>	<b>Probability</b>	<b>Expected Value = (Sales units X Probability)</b>
1,000	0.2	200
1,500	0.1	150
2,000	0.3	600
2,500	0.3	750
3,000	0.1	300
Expected Sales Units ( $\mu$ )		2,000

# Probability Distribution

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(iii) Expected Profit :

= (Expected Sales Units  $\times$  Contribution Margin per Unit) – Fixed Cost

$$\pi = \mu (SP - UVC) - FC$$

Now, Expected Profit =  $[2,000 \times (50 - 30)] - 30,000 = \text{Rs. } 10,000$

Where,

$\pi$  = Expected Profit

$\mu$  = Expected Sales Value or Mean of Random Variable Sales

SP = Unit Selling Price

UVC = Unit Variable Cost

FC = Total Fixed Cost

# Standard Deviation

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- The mean or expected value of random variable is not sufficient to study the actual behavior of random variable.
- The dispersion of random variable about its expected value should be measured and standard deviation provides measures of this dispersion.
- In statistical terms, standard deviation is defined as the square root of the mean of squared deviation, where deviation is the difference between an outcome and the expected values of all outcomes.
- Further more, to calculate the value of standard deviation, we provide weight to the square of each deviation by its probability of occurrence.

# Standard Deviation

The following steps are required for the calculation of standard deviation ( $\sigma$ ) :

<b>Step 1 :</b>	To find out expected sales value ( $\mu$ )
<b>Step 2 :</b>	To find out deviation ( $dv$ ) by deducting expected sales value from expected sales

Deviation ( $dv$ ) = Sales Value - Expected Sales Value |

Symbolically,  $dv = S - \mu$

<b>Step 3 :</b>	To obtain the square of deviation ( $dv^2$ )
<b>Step 4 :</b>	Multiply the square deviation by assigned probability and find out the product of each item $\text{Product} = dv^2 \times P$
<b>Step 5 :</b>	Sum the products from step 4 and find out the standard deviation ( $\sigma$ ) $\sigma = \sqrt{\sum (dv^2 \times P)}$

# Standard Deviation

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## Question

A company plans to introduce a new product P. The company anticipated the demand for new product along with their probability as under :

<b>Demand Units</b>	<b>Probability</b>
4,000	0.1
5,000	0.2
6,000	0.2
7,000	0.3
8,000	0.2

The Cost data for the product are :

Selling Price per unit = Rs. 30

Variable Cost per unit = Rs. 20

Fixed Cost for the period = Rs. 50,000

- Required : (i) Expected Demand. (ii) Expected Contribution Margin.  
(iii) Expected Profit. (iv) Standard Deviation of Demand units.  
(v) Standard Deviation of Profit.

# Standard Deviation

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SOLUTION:

(i) Calculation of expected demand :

<b>Demand Units</b>	<b>Probability</b>	<b>Expected Value</b>
4,000	0.1	400
5,000	0.2	1,000
6,000	0.2	1,200
7,000	0.3	2,100
8,000	0.2	1,600
Expected Demand ( $\mu$ )		6,300

(ii) Expected Contribution Margin =  $\mu \times \text{CMPU} = 6,300 \times 10 = \text{Rs. } 63,000$

(iii) Expected Profit =  $(\mu \times \text{CMPU}) - \text{Fixed Cost}$   
=  $63,000 - 50,000$   
=  $\text{Rs. } 13,000.$

# Standard Deviation

(iv) Standard Deviation of Demand units :

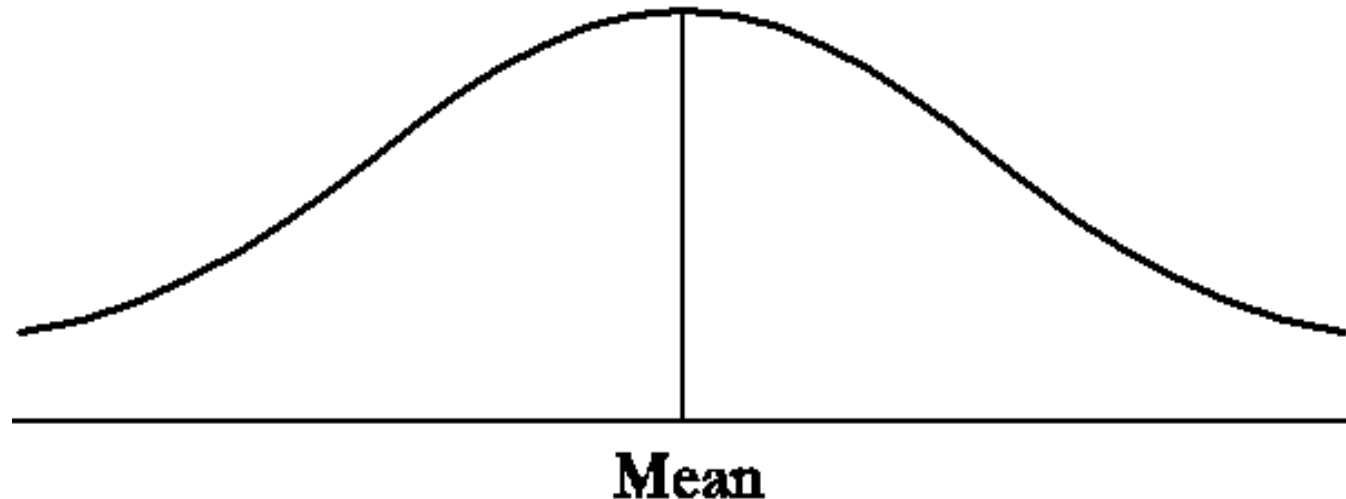
<b>Demand</b>	$\mu$	<b>dv/100</b>	<b>dv<sup>2</sup></b>	<b>P</b>	<b>dv<sup>2</sup> × P</b>
4,000	6,300	- 23	529	0.1	52.9
5,000	6,300	-13	169	0.2	33.8
6,000	6,300	-3	9	0.2	1.8
7,000	6,300	7	49	0.3	14.7
8,000	6,300	17	289	0.2	57.8
$\sum (dv^2 \times P) =$					161

$$\sigma_Q = \sqrt{\sum (dv^2 \times P)} \times 100 = \sqrt{161} \times 100 = 1269 \text{ units (Approximately)}$$

# Normal Distribution

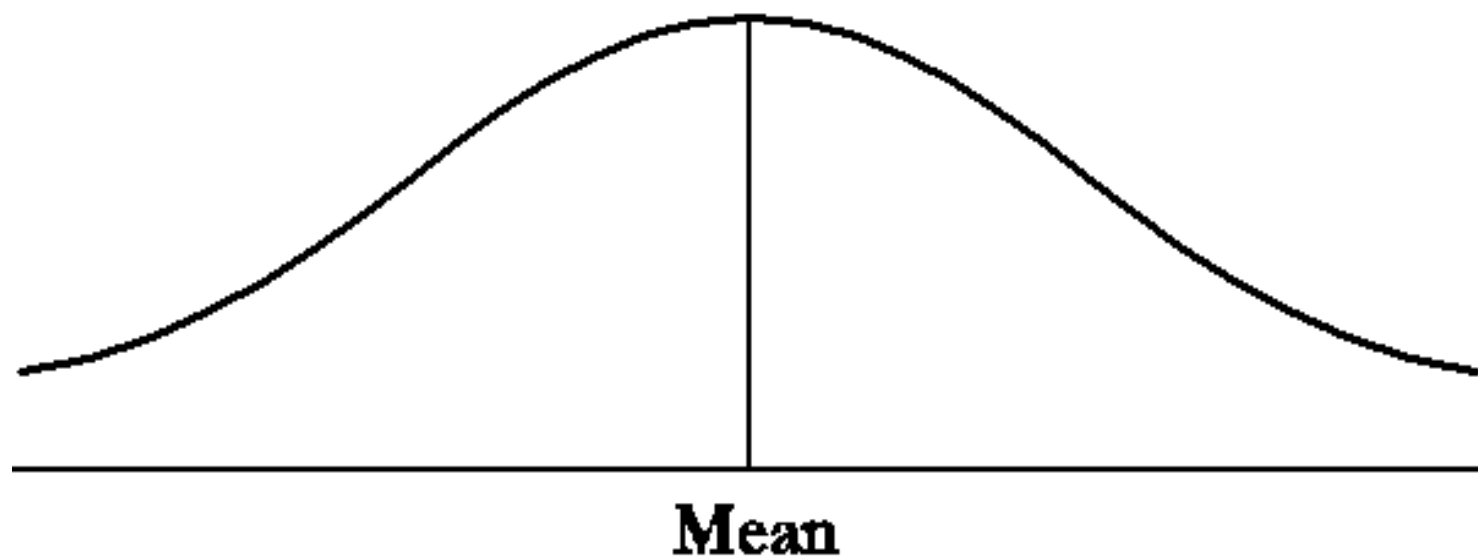
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- Normal distribution is the most important and frequently used continuous probability distribution.
- Randomly generated are in bell shaped curve (assumption)
- The normal probability distribution is a smooth, symmetric, continuous, bell shaped curve as shown below.
- The area under the curve sums to one (100%),
- 50% each side of mean value, where mean value = median value = mode value



# Normal Distribution

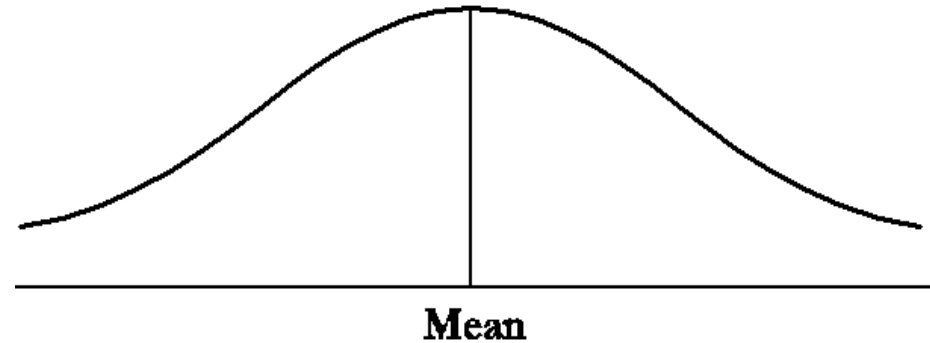
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# Normal Distribution

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$$Z = \frac{X - \mu_Q}{\sigma_Q} \quad \text{OR} \quad Z = \frac{X - \mu_P}{\sigma_P}$$



where,

$Z$  = Standard variate (or number of standard) deviations from  $x$  to the mean of the distribution)

$x$  = value of the random variable under consideration

$\mu_Q$  = Expected sales units (mean of the distribution of random variable in units)

$\sigma_Q$  = Standard deviation of the distribution in units

$\mu_P$  = Expected profit (mean of the distribution of random variable in amount)

$\sigma_P$  = Standard deviation of the distribution in amount

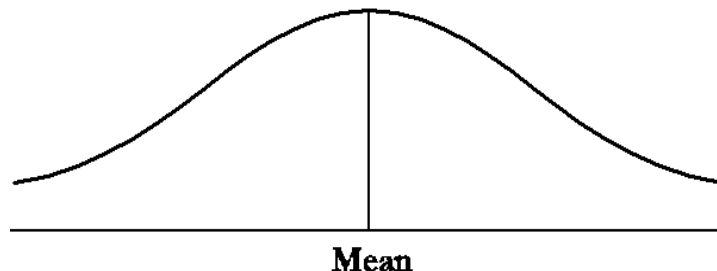
$Z$  would equal zero, when value  $x = \mu$

$Z$  would be positive, when value  $x > \mu$

$Z$  would be negative, when value  $x < \mu$

# Calculation of Probability

<b>Step 1 :</b>	To find out expected sales units ( $\mu_Q$ )
<b>Step 2 :</b>	To find out standard deviation in units ( $\sigma_Q$ )
<b>Step 3 :</b>	To find out expected profit ( $\mu_P$ )
<b>Step 4 :</b>	To find out standard deviation in units ( $\sigma_P$ )
<b>Step 5 :</b>	To find the probabilities $Z = \frac{X - \mu_Q}{\sigma_Q} \quad \text{OR} \quad Z = \frac{X - \mu_P}{\sigma_P}$



# Question

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The sales unit expected by a sales manager of a company for the one of its products are :

Sales Units	Probability
5,000	0.1
6,000	0.4
7,000	0.3
8,000	0.2

The fixed costs are Rs. 6,00,000. The selling price per unit is Rs. 300 and variable cost per unit is Rs. 200.

Required :

- (i) Break-even Sales units
- (ii) Expected Sales units
- (iii) Standard Deviation of expected units
- (iv) Expected Contribution Margin
- (v) Expected Profit
- (vi) Standard Deviation of Profit
- (vii) Probability of at least Break-even
- (viii) Probability of incurring Losses
- (ix) Probability of making at least Rs. 75,000 profit

# Solution

$$\begin{aligned} \text{(i) Break-even Sales units} &= \frac{\text{Fixed Cost}}{\text{Unit Selling Price} - \text{Unit Variable Cost}} \\ &= \frac{6,00,000}{300 - 200} \\ &= 6,000 \text{ units} \end{aligned}$$

(ii) Expected Sales unit :

Sales Units	Probability	Expected Value
5,000	0.1	500
6,000	0.4	2,400
7,000	0.3	2,100
8,000	0.2	1,600
$\mu_Q$ , Expected Sales Units		6,600

# Solution

(iii) Standard Deviation of expected units :

<b>Sales Units</b>	$\mu$	<b>dv/100</b>	<b>dv<sup>2</sup></b>	<b>P</b>	<b>dv<sup>2</sup> × P</b>
5,000	6,600	- 16	256	0.1	25.6
6,000	6,600	- 6	36	0.4	14.4
7,000	6,600	4	16	0.3	4.8
8,000	6,600	14	196	0.2	39.2
$\Sigma (dv^2 \times P) =$					84

$$\begin{aligned}\sigma_Q &= \sqrt{\Sigma (dv^2 \times P)} \times 100 \\ &= \sqrt{84} \times 100 \\ &= 916.52 \text{ or } 917 \text{ (Approx)}\end{aligned}$$

# Solution

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$$\begin{aligned} \text{(iv) Expected Contribution Margin} &= \mu_Q \times \text{CMPU} \\ &= 6,600 \times (300 - 200) \\ &= \text{Rs. } 6,60,000 \end{aligned}$$

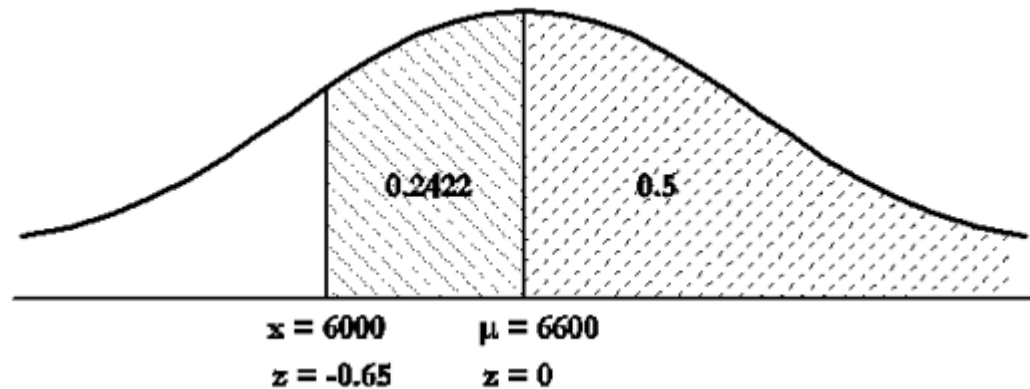
$$\begin{aligned} \text{(v) Expected Profit, } \mu_P &= (\mu_Q \times \text{CMPU}) - \text{FC} \\ &= 6,60,000 - 6,00,000 \\ &= \text{Rs. } 60,000 \end{aligned}$$

$$\begin{aligned} \text{(vi) Standard Deviation Profit, } \sigma_P &= \sigma_Q \times \text{CMPU} \\ &= 917 \times 100 = \text{Rs. } 91,700 \end{aligned}$$

# Solution

(vii) Probability at Least Break-even units

$$\begin{aligned} Z &= \frac{X - \mu_Q}{\sigma_Q} \\ &= \frac{6,000 - 6,600}{916.52} \\ &= -0.65 \end{aligned}$$



Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852

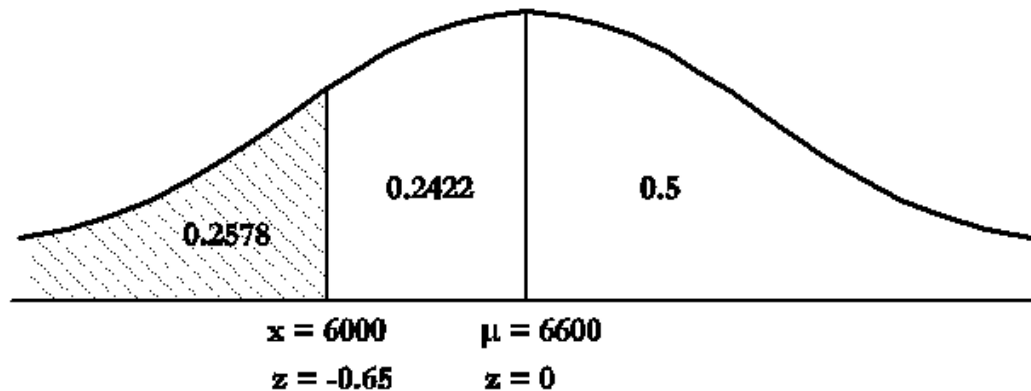
From z table, the probability of sales units lies in between 6,000 units to 6,600 units = 0.2422

$\therefore$  Probability at least break-even sales =  $0.50 + 0.2422 = 0.7422$  or 74.22%

# Solution

(viii) Probability of Incurring Losses

$$\begin{aligned} Z &= \frac{X - \mu_Q}{\sigma_Q} \\ &= \frac{6,000 - 6,600}{916.52} \\ &= -0.65 \end{aligned}$$



Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852

From z table, the probability of sales units lies in between 6,000 units to 6,600 units = 0.2422

$\therefore$  Probability of incurring loss =  $0.50 - 0.2422 = 0.2578$  or 25.78%

# Solution

(vii) Probability at least break-even sales

(viii) Probability of incurring losses

$$\begin{aligned} |Z| &= \frac{X - \mu_P}{\sigma_P} \\ &= \frac{0 - 60,000}{91,700} \\ &= -0.65 \end{aligned}$$

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852

From z table, the probability of profit lies in between Rs. 0 to Rs. 60,000 = 0.2422

∴ Probability at least break-even sales = 0.50 + 0.2422 = 0.7422 or 74.22%

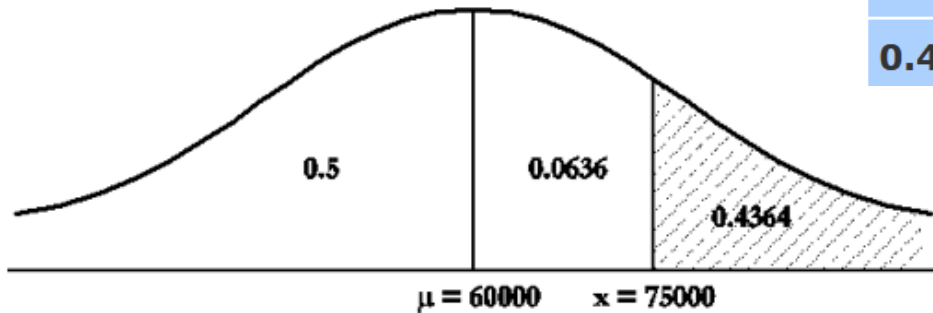
∴ Probability of incurring loss = 0.50 - 0.2422 = 0.2578 or 25.78%

# Solution

(ix) Probability of making at least Rs. 75,000 profit

$$\begin{aligned} Z &= \frac{X - \mu_P}{\sigma_P} \\ &= \frac{75,000 - 60,000}{91,700} \\ &= 0.16 \end{aligned}$$

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879



From z table, the probability of profit lies in between Rs. 60,000 to Rs. 75,000 = 0.0636

$\therefore$  Probability of profit at least Rs. 75,000 =  $0.50 - 0.0636 = 0.4364$  or 43.64%

$\therefore$  Probability of profit lesser than Rs 75,000 =  $0.50 + 0.0636 = 0.5636$  or 56.36%

# Question

A firm introduces new products "X", which required annual fixed cost Rs. 4,00,000. The selling price Rs. 10 per unit and the variable cost Rs. 8 per unit. The probability distribution for the products "X" are as follows:

<b>Events (Units Demanded)</b>	<b>Probability Distribution</b>
1,00,000	0.10
2,00,000	0.20
3,00,000	0.40
4,00,000	0.20
5,00,000	0.10

- Required:
1. Probability at least break-even sales
  2. Probability of profit at least Rs. 250,000
  3. Probability of profit lies between Rs. 1,00,000 to Rs. 2,50,000
  4. Probability of loss greater than Rs. 250,000

# Solution

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Step 1: Find out expected sales units ( $\mu_Q$ )

<b>Sales Units</b>	<b>Probability</b>	<b>Expected Value</b>
1,00,000	0.10	10,000
2,00,000	0.20	40,000
3,00,000	0.40	120,000
4,00,000	0.20	80,000
5,00,000	0.10	50,000
$\mu_Q$ , Expected Sales Units		300,000

# Solution

Step 2: Find out standard deviation in units ( $\sigma_Q$ )

<b>S</b>	$\mu_Q$	<b>dv/100,000</b>	<b>dv<sup>2</sup></b>	<b>P</b>	<b>dv<sup>2</sup> × P</b>
1,00,000	300,000	-2	4	0.10	0.40
2,00,000	300,000	-1	1	0.20	0.20
3,00,000	300,000	0	0	0.40	0.00
4,00,000	300,000	+1	1	0.20	0.20
5,00,000	300,000	+2	4	0.10	0.40
$\Sigma (dv^2 \times P) =$					1.20

$$dv = S - \mu_Q$$

$$\begin{aligned}\sigma_Q &= \sqrt{\Sigma (dv^2 \times P)} \times 100,000 \\ &= \sqrt{1.20} \times 100 \\ &= 109,545\end{aligned}$$

# Solution

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Step 3: Find out expected profit ( $\mu_P$ )

$$\begin{aligned}\mu_P &= (\mu_Q \times \text{CMPU}) - \text{FC} \\ &= 300,000 \times (10 - 8) - 400,000 \\ &= \text{Rs. } 200,000\end{aligned}$$

Step 4: Find out standard deviation in profit ( $\sigma_P$ )

$$\begin{aligned}\sigma_P &= (\sigma_Q \times \text{CMPU}) | \\ &= 109,545 \times (10 - 8) \\ &= 219,090\end{aligned}$$

# Solution

Step 5: Find out Probability

1. Probability at least break-even sales

$$Z = \frac{X - \mu_P}{\sigma_P} = \frac{0 - 200,000}{219,090} = -0.91$$

From Z table, area of profit lies between Rs. 0 and Rs. 200,000 = 0.3186

$$\begin{aligned}\therefore \text{Probability at least break-even sales} &= 0.50 + 0.3186 \\ &= 0.8186 \\ &= 81.86\%.\end{aligned}$$

Z	0.00	0.01	0.02
0.0	0.0000	0.0040	0.0080
0.1	0.0398	0.0438	0.0478
0.2	0.0793	0.0832	0.0871
0.3	0.1179	0.1217	0.1255
0.4	0.1554	0.1591	0.1628
0.5	0.1915	0.1950	0.1985
0.6	0.2257	0.2291	0.2324
0.7	0.2580	0.2611	0.2642
0.8	0.2881	0.2910	0.2939
0.9	0.3159	0.3186	0.3212
1.0	0.3413	0.3438	0.3461

# Solution

2. Probability of profit at least Rs. 250,000|

$$Z = \frac{X - \mu_P}{\sigma_P} = \frac{250,000 - 200,000}{219,090} = +0.23$$

From Z table, area of profit lies between Rs. 200,000 and Rs. 250,000 = 0.0910

∴ Probability of profit at least Rs. 250,000 = 0.50 - 0.0910

$$= 0.4090 = 40.90\%$$

Z	0.00	0.01	0.02	0.03	0.04
0.0	0.0000	0.0040	0.0080	0.0120	0.0160
0.1	0.0398	0.0438	0.0478	0.0517	0.0557
0.2	0.0793	0.0832	0.0871	0.0910	0.0948
0.3	0.1179	0.1217	0.1255	0.1293	0.1331

# Solution

3. Probability of profit lies between Rs. 1,00,000 to Rs. 2,50,000

$$Z = \frac{X - \mu_P}{\sigma_P} = \frac{100,000 - 200,000}{219,090} = -0.46$$

$$Z = \frac{X - \mu_P}{\sigma_P} = \frac{250,000 - 200,000}{219,090} = +0.23$$

From Z table, area of profit lies between Rs. 100,000 and Rs. 200,000 = 0.1772

From Z table, area of profit lies between Rs. 200,000 and Rs. 250,000 = 0.0910

$$\begin{aligned} \therefore \text{Probability of profit lies between Rs. 1,00,000 to Rs. 2,50,000} \\ &= 0.1772 + 0.0910 \\ &= 0.2682 = 26.82\%. \end{aligned}$$

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123

# Solution

4. Probability of loss greater than Rs. 250,000

$$Z = \frac{X - \mu_P}{\sigma_P} = \frac{-250,000 - 200,000}{219,090} = -2.05$$

From Z table, area of profit (loss) lies between (Rs. 250,000) and Rs. 200,000 = 0.4798

∴ Probability of loss greater than Rs. 250,000 = 0.50 – 0.4798

$$= 0.0202 = 2.02\%$$

<i>z</i>	.00	.01	.02	.03	.04	.05
0.0	.0000	.0040	.0080	.0120	.0160	.0199
0.1	.0398	.0438	.0478	.0517	.0557	.0596
0.2	.0793	.0832	.0871	.0910	.0948	.0987
0.3	.1179	.1217	.1255	.1293	.1331	.1368
0.4	.1554	.1591	.1628	.1664	.1700	.1736
0.5	.1915	.1950	.1985	.2019	.2054	.2088
0.6	.2257	.2291	.2324	.2357	.2389	.2422
0.7	.2580	.2611	.2642	.2673	.2704	.2734
0.8	.2881	.2910	.2939	.2967	.2995	.3023
0.9	.3159	.3186	.3212	.3238	.3264	.3289
1.0	.3413	.3438	.3461	.3485	.3508	.3531
1.1	.3643	.3665	.3686	.3708	.3729	.3749
1.2	.3849	.3869	.3888	.3907	.3925	.3944
1.3	.4032	.4049	.4066	.4082	.4099	.4115
1.4	.4192	.4207	.4222	.4236	.4251	.4265
1.5	.4332	.4345	.4357	.4370	.4382	.4394
1.6	.4452	.4463	.4474	.4484	.4495	.4505
1.7	.4554	.4564	.4573	.4582	.4591	.4599
1.8	.4641	.4649	.4656	.4664	.4671	.4678
1.9	.4713	.4719	.4726	.4732	.4738	.4744
2.0	.4772	.4778	.4783	.4788	.4793	.4798

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**Thank You**