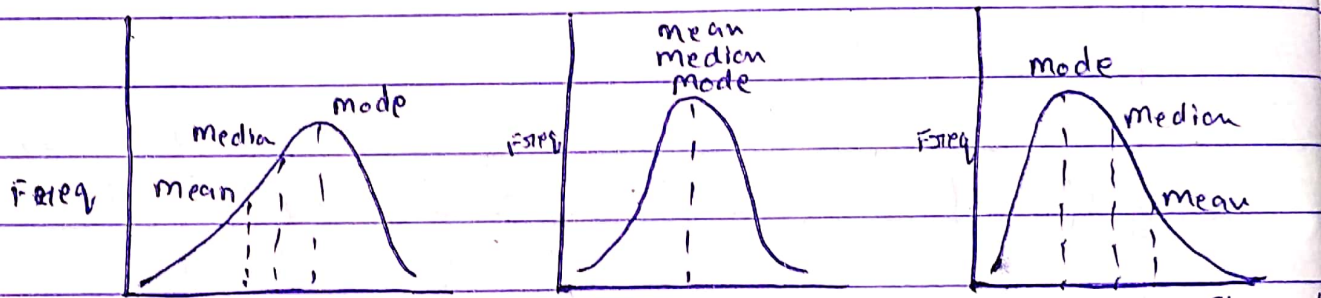
Ans 1 Skewness:

Skewness in data distribution refers to the symmetry of or departure from symmetry of the distribution.



~~Abs~~ Absolute skewness = mean - mode.

if mean > mode ⇒ Positively skewed.
if mean < mode ⇒ Negatively skewed
otherwise ~~No~~ Normal distribution

Ans 2 ~~n = 15~~

$n = 500$

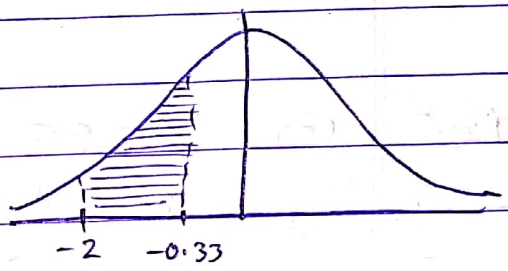
$\bar{x} = 150$ thousand

$\sigma = 15$ thousand

~~(a) P(120 ≤ x ≤ 145)~~

~~P(120 ≤ x ≤ 145) =~~

(a) $x_1 = 120$, $x_2 = 145$



$$z_1 = \frac{120-150}{15} = \frac{-30}{15} = -2$$

$$z_2 = \frac{145-150}{15} = \frac{-5}{15} = -0.33$$

$\therefore P(120 \le x \le 140) = P(-2 \le z \le -0.33)$

$= P(z < 2) - P(z < 0.33)$

$= 0.4772 - 0.1293 = 0.3479$

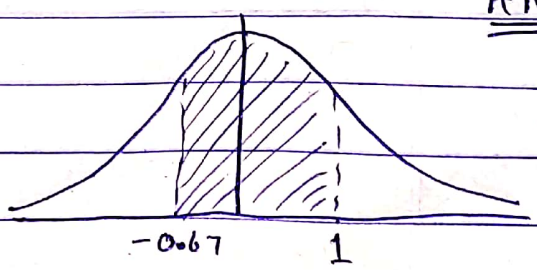
Expected no. of branches sold out $= 0.3479 \times 500$

$= 173.95 \approx 174$

Ans

(b) $x_1 = 140$ $x_2 = 165$

$$z_1 = \frac{140-150}{15} \qquad z_2 = \frac{165-150}{15}$$



$z_1 = -0.67$ $z_2 = 1$

$\therefore P(140 \le x \le 165) = P(-0.67 \le z \le 1) = P(z < 1) + P(z < 0.67)$

$= 0.3413 + 0.2486$

$P(140 \leq x \leq 165) = P(-0.67 \leq z \leq 1) = 0.5895$

Expected no. of branches sold out = 0.5895×500

$= 294.95$

$\approx$ 295 branches

Ans

Ans.3 (a) $x = 85$, $y = 27\%$ $\alpha = 0.05$

$n = 350$

$H_0 : p \leq 0.27$

$H_1 : p > 0.27$

$$z = \frac{85/350 - 0.27}{\sqrt{\frac{(0.27)(0.73)}{350}}} = \frac{-0.02714}{0.02373} = -1.14367$$

$z_\alpha = z_{0.05} = 1.645$

$z < z_\alpha \Rightarrow -1.14367 < 1.645$ which is not in rejection region hence Null hypothesis is accepted less ~~than 27% of~~

(b) $n = 400$, $y = 0.27$ $\alpha = 0.05$

$x = 100$

$H_0 : p \leq 0.27$

$H_1 : p > 0.27$

$$z = \frac{108/400 - 0.27}{\sqrt{\frac{(0.27)(0.73)}{400}}} = \frac{-0.02}{0.0219} = -0.9009$$

$z_\alpha = 1.645$

$z = -0.9009 < z_\alpha$

Hence null hypothesis is accepted.