Q.) Insurance company has two agents.

Monthly claims data of both is normally distributed & independent

Mean Monthly Claims } 3600 ₹ (μ_{sum})

S.D } 600 ₹ (σ_{sum})

In 11.5 % of observations; claims of 2^{nd} agent < 1^{st} agent

What is mean monthly claims of 1^{st} Agent?

Sum of two [indep] ★ normal distributions is also normal with

$\boxed{\mu_{sum} = \mu_1 + \mu_2}$ ① $\boxed{\sigma_{sum}^2 = \sigma_1^2 + \sigma_2^2}$

Consider Difference between 1^{st} agent observations (O_1) & 2^{nd} agent observations (O_2)

This difference will also be normal with.

$\boxed{\mu_{diff} = \mu_1 - \mu_2}$ $\boxed{\sigma_{diff}^2 = \sigma_1^2 + \sigma_2^2} = \sigma_{sum}^2$ ★ (not '−')

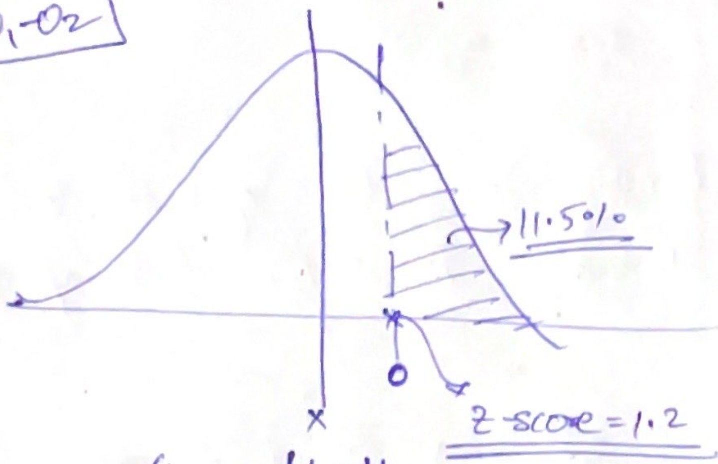
Given that in 11.5 % observations; $O_2 < O_1$

∴ $\boxed{O_1 - O_2 > 0}$ for 11.5 % obs.

i.e $\boxed{P(O_1 - O_2 > 0) = 0.115}$

↳ This occurs at $\boxed{z\text{-value} = 1.2}$

$\boxed{O_1 - O_2}$



$\mu_{diff} = \mu_1 - \mu_2$

$\therefore z = 1.2$

$$\frac{0 - (\mu_1 - \mu_2)}{\sigma_{diff}} = 1.2$$

$$\mu_2 - \mu_1 = (1.2)(\sigma_{diff})$$

$$\mu_2 - \mu_1 = (1.2)(\sigma_{sum})$$

$$\mu_2 - \mu_1 = 1.2 \times 600$$

$$\boxed{\mu_2 - \mu_1 = 720} \quad (2)$$

(1) − (2)

$$\mu_2 + \mu_1 = 3600$$

$$\mu_2 - \mu_1 = 720$$

$$- \quad (+) \quad -$$

$$2\mu_1 = 2880$$

$$\boxed{\mu_1 = 1440 \text{ ₹}}$$