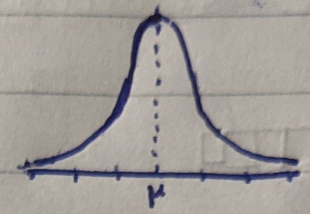
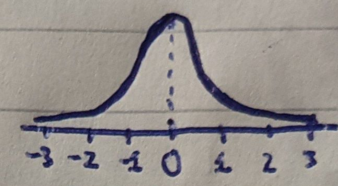
1. (a) Distribution of Y_1



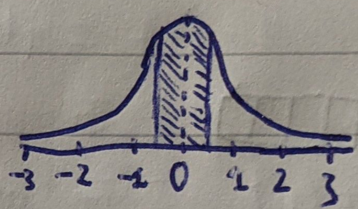
$\sigma = 1$

Distribution of $Y_1 - \mu$



$\sigma = 1$

$P(|Y_1 - \mu| \leq \frac{1}{2})$

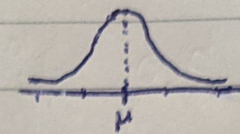


$\sigma = 1$

So $P(|Y_1 - \mu| \leq \frac{1}{2}) = P(-\frac{1}{2} \leq Z \leq \frac{1}{2})$ where $Z \sim N(0,1)$

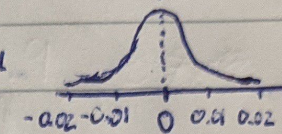
$\therefore P(|Y_1 - \mu| \leq \frac{1}{2}) = 0.6915 - (1 - 0.6915) = 0.383$

1. (b) Distribution of $\bar{Y}$



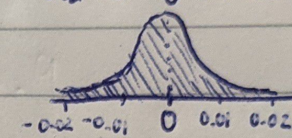
$\sigma = \frac{1}{3}$

Distribution of $\bar{Y} - \mu$



$\sigma = \frac{1}{3}$

$P(|\bar{Y} - \mu| \leq \frac{1}{2})$



$\sigma = \frac{1}{3}$

So $P(|\bar{Y} - \mu| \leq \frac{1}{2}) = P(-\frac{1/2}{1/3} \leq Z \leq \frac{1/2}{1/3})$ where $Z \sim N(0,1)$

$\therefore P(|\bar{Y} - \mu| \leq \frac{1}{2}) = 0.9332 - (1 - 0.9332) = 0.8664$

2 $X_i \sim P(2)$ where X_i is the number of accidents per week

$X = \sum_{i=1}^{52} X_i \sim P(\sum_{i=1}^{52} 2) = P(104)$ where X is the number of accidents in a year

$\therefore X \sim P(104)$

$P_r(X < 100) = \sum_{i=1}^{99} \frac{e^{-104} 104^i}{i!} = 0.3343$