

## Assignment 9.1

① claim is  $\mu \geq 10,000$  hrs

Sample size =  $n = 30$

mean of sample  $\bar{x} = 9,900$  hrs

Assumed Population S.D  $\sigma = 120$  hrs

level of significance  $\alpha = 0.05$  :  $Z_{\alpha} = -1.645$

As population S.D is known we use

$$\text{Test statistic } z = \frac{(\bar{x} - \mu_0)}{\sigma/\sqrt{n}} = \frac{-100}{120/\sqrt{30}} = -4.56$$

Here null Hypothesis

$$H_0 = \mu \leq 10,000 \text{ hrs}$$

Alternate Hypothesis

$$H_1 = \mu > 10,000 \text{ hrs}$$

$\therefore$  as  $z < Z_{\alpha}$  we reject  $H_0$  & accept  $H_1$   
i.e. lifetime of bulb is above 10,000 hrs

② claim is  $\mu \leq 2$  gm of fat.

sample size  $n = 51$  cookies

mean of sample  $\bar{x} = 2.1$  grams

Sample standard deviation  $s = 0.3$  gm

level of significance  $\alpha = 0.05$  :  $Z_{\alpha} = 1.645$

Here null Hypothesis  $H_0 = \mu \geq 2$  gm

Alternate Hypothesis  $H_1 = \mu < 2$  gm

Since population S.D  $\sigma$  is unknown we use

$$\text{Test statistic } z = \frac{(\bar{x} - \mu_0)}{s/\sqrt{n}} = \frac{(2.1 - 2)}{0.3/\sqrt{51}} = -2.380$$

$\therefore$  as  $z > Z_{\alpha}$  we reject  $H_0$  & accept  $H_1$

i.e. there is almost ~~to~~ 2 gm of fat