5.

$n = 52$
$\bar{x} = 98.2846$
$s = 0.6824$

→ degree of freedom $= n-1 = 52-1 = 51$
→ significance level $(\alpha) = 0.02$

→ two-tail test :-

→ $H_0 : \mu_0 = 98.6$
$H_a : \mu_1 \neq 98.6$

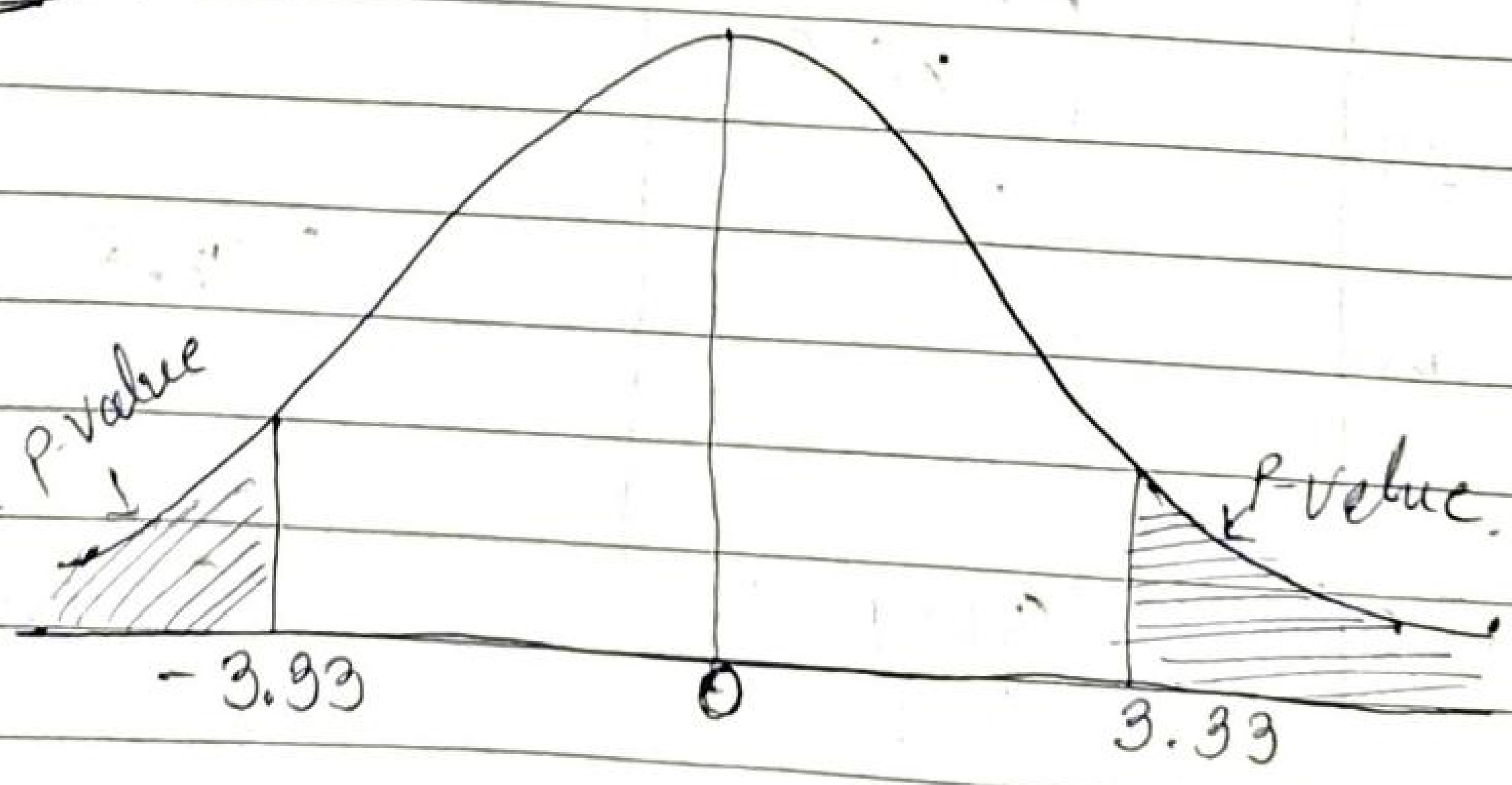
→ ~~z~~ z-test = because ~~n <~~ $n > 30$
so, it is qualified for the z-test

$$z\text{-test} = \frac{\bar{x} - \mu_0}{6/\sqrt{n}}$$

$$= \frac{98.2846 - 98.6}{\frac{0.6824}{\sqrt{52}}} = \frac{-0.3154}{\frac{0.6824}{7.21}}$$

zscore $= -3.3324$

→ P-Value :-

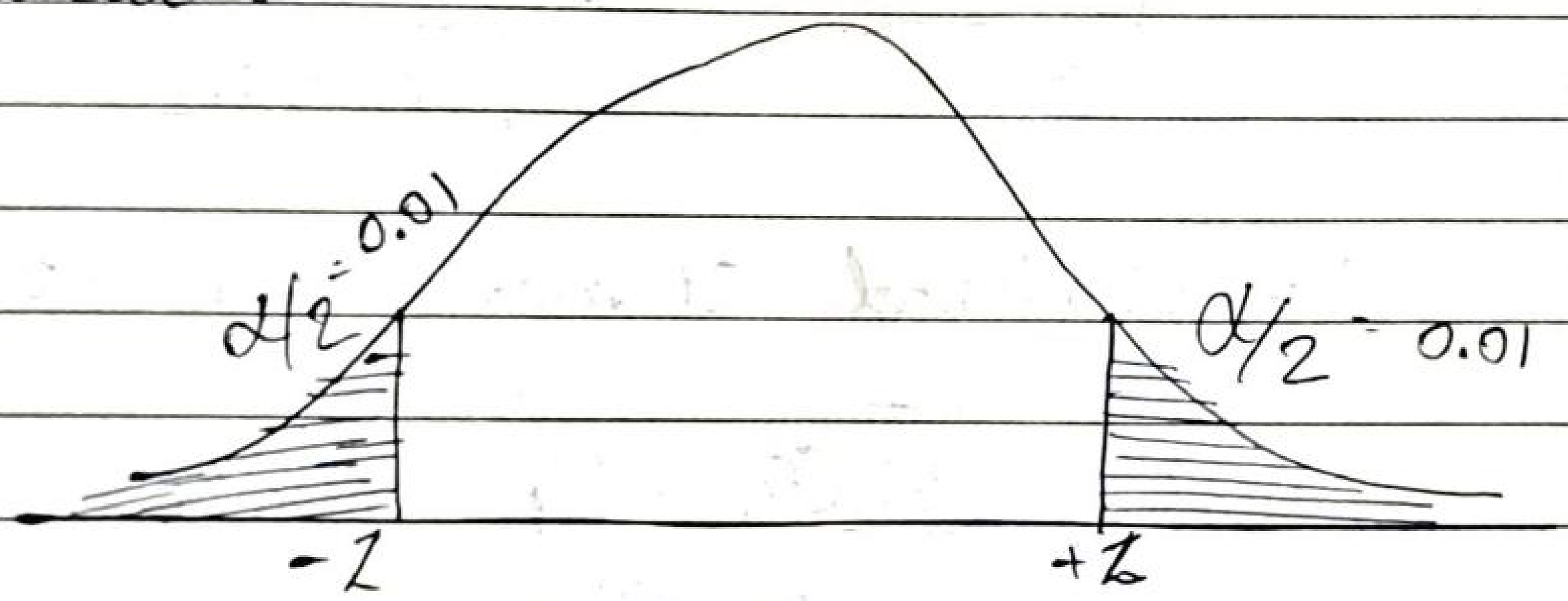


→ From z-table p-value is 0.0004

→ $p\text{-value} = 2 \times P(Z \leq -3.33)$
$= 2 \times 0.0004$
$= 0.0008$

$p\text{-value} < \alpha$
$0.0008 < 0.02$
So, we will reject the null hypothesis

→ Zcritical :-



from Z-table Zcritical $= -2.33$
$-Z_{\alpha/2} = -2.33$
$Z_{\alpha/2} = 2.33$
means Zcritical $= -2.33$ or $+2.33$

Rejection Rule:-

~~Ho if Z ≤ -Zα~~
Zcritical > Z score : will reject the null hypothesis

$-2.33 > -3.33$

So, We can say that we will reject the null hypothesis.

→ Conclusion :- So, our avg. body temprature can be greater than 98.6° or sometimes may be less than 98.6°