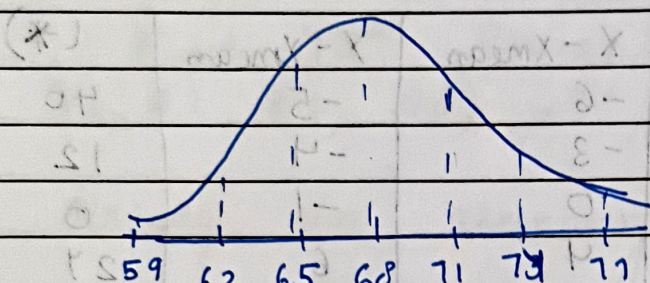


STANDARD NORMAL VARIATE

Ques male height follows normal distribution with mean 68 and std = 3 inches. Find probability that a selected adult male from this population is taller than 72 inches.

Ans Given → normal dist mean = 68, std = 3



Convert into standard normal variate

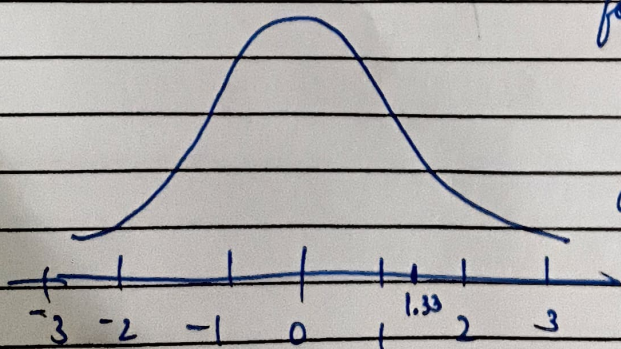
$Z \rightarrow (0, 1)$

find the standardized value of 72.

$$Z = \frac{X - M}{\sigma}$$

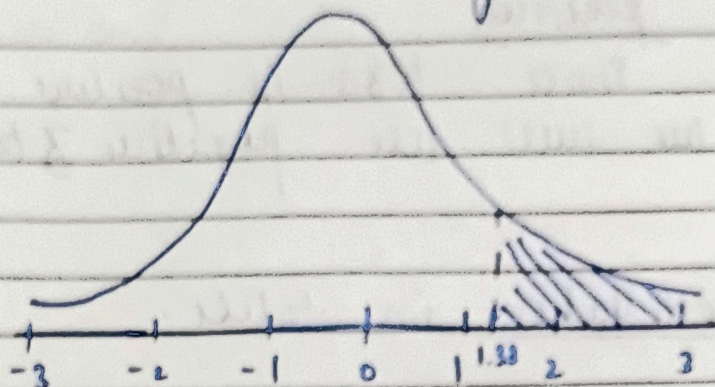
$$Z = \frac{72 - 68}{3} = \frac{4}{3} = 1.33$$

72 in standardized form will belong around here



and we have to find probability more of person more than 72

ie means, we have to find probability of the shaded area (we can say area under curve)



Now how to find these area?

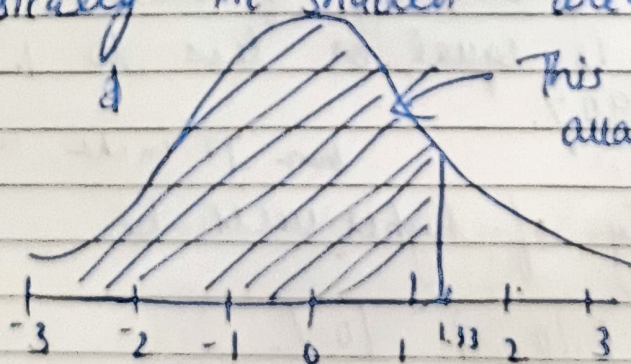
Sol \Rightarrow Z table
 \Downarrow

Z Table \rightarrow It contains probability density for each z value of standard normal variate.

Therefore it will also contain z value probability density for the value $\Rightarrow 1.33$

By probability density it means it tells the probability of 1.33 or less than 1.33

Basically the shaded area:-



This area is already available

& we have to find more of more than 1.33

Z-Table types

negative

positive

Since 1.33 is positive
we will use positive Z-table

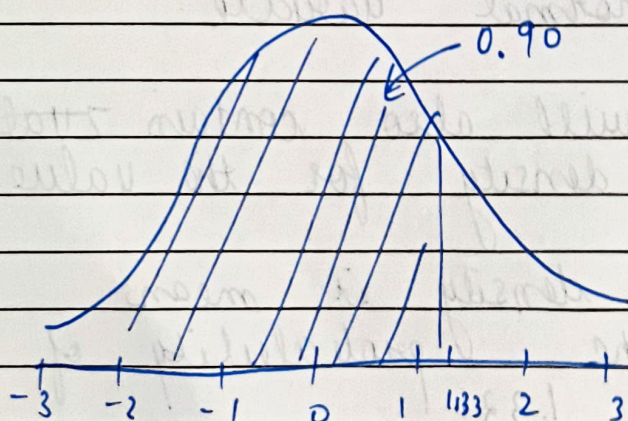
Now to find the value in table.

1.33

first 2 values i.e. 1.3 on x-axis
& .03 on y-axis

and after looking we got $\Rightarrow 0.90824$.

so we found the area less than ^{equal to} 1.33



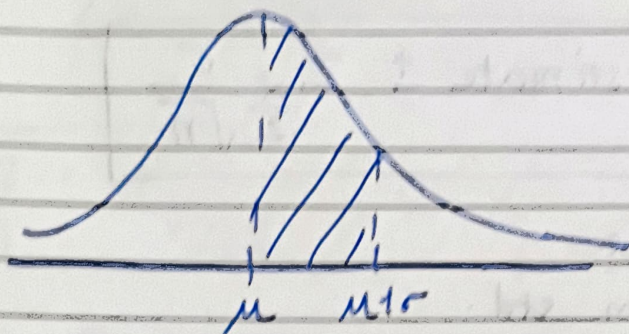
Interpretation \Rightarrow probability of selected random variable height is equal or less to 1.33/72 inches is 90%.

than 72 inches cut's

Hence probability of higher will be

$$1 - 0.90 \Rightarrow 0.10 \Rightarrow 10\%$$

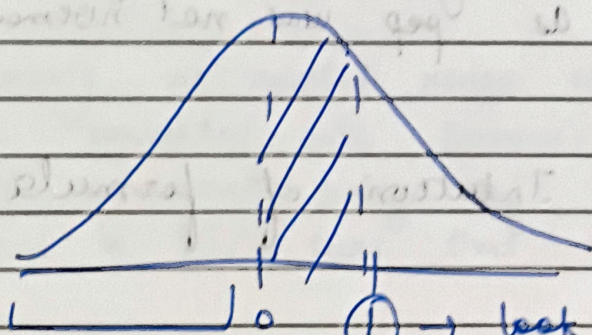
Ex2. For a normal distribution $X \sim (\mu, \sigma)$
 what percent population lie between 1st,
 2nd and 3rd.



Convert it into Standard normal variable

$$\text{std}(\mu) = \mu - \mu = 0$$

$$\text{std}(\sigma) = \frac{(\mu + \sigma) - \mu}{\sigma} = 1$$

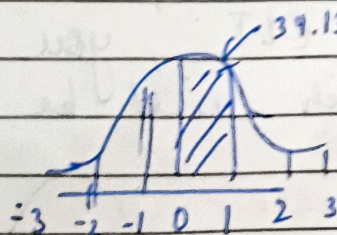


50%

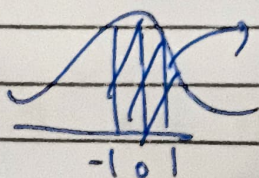
① → look in Z table
 & we will get area upto 1

84.13

Subtract ⇒ 34.13



Since this is symmetrical



$$34.13 + 34.13 = 68.26$$