Code

critical value Z for a 99% confidence interval using the qnorm() function. For a two-sided confidence interval, a 99% confidence level means that $\alpha = 1 - 0.99 = 0.01$, and we are interested in the value Z such that the area to the left is $1 - \alpha/2 = 1 - 0.01/2 = 0.995$.

```
#critical value Z
qnorm(0.995) #give 2.58
```

Based on the critical value calculated in the previous step, z_99 = 2.58, the formula for the 99% confidence interval is:

$$\text{Confidence Interval} = \text{Point Estimate} \pm \underbrace{2.58 \times \text{SE}}_{\text{MoE}}$$

The critical Z-value, $\mathbf{Z_{1-\alpha/2}}$, is replaced by **2.58**, which corresponds to the **99**% confidence level ($\alpha = 0.01$). This value is the multiplier for the Standard Error (SE) to calculate the Margin of Error (MoE).