Exam Assistance Note

X_0 = Value in the Base Year , X_n = Value in the Recent Year

$\hat{X}_{n+k}$ = Predicted Value in the Year $n+k$

CBR= Crude Brith Rate (out of 1000 population) , CDR= Crude Death Rate (out of 1000 population)

Percentage of Change	$\frac{X_n - X_0}{X_0} \times 100\%$
Average Annual Growth Rate	$\text{AAGR}\% = \left(\frac{X_n}{X_0}\right)^{\left(\frac{1}{n}\right)} \times 100 - 100\%$
Prediction in the year $n+k$ based on AAGR% and X_n	$\widehat{X}_{n+k} = X_n \times \left(\frac{100+AAGR}{100}\right)^{k}$
Average Growth Rate Percentage (AGR%) based on CBR and CDR	$\text{AGR}\% = \frac{\text{CBR} - \text{CDR}}{10}\%$

Related to Human Development Index (HDI)

PcGNI = Percapita Gross National Product

$$\text{General Dimension Index} := \frac{\text{Actual Value} - \text{Min}}{\text{Max} - \text{Min}}$$

$$\text{Income Index} : \text{I}_{\text{Income}} = \frac{\log(\text{PcGNI}) - \log(\text{Minimun PcGNI})}{\log(\text{Maximum PcGni}) - \log(\text{Minimun PcGNI})}$$

$$\text{Education Index} : \text{I}_{\text{Education}} = \frac{\sqrt{I_1 \times I_2}}{0.951}, \text{ where}$$

I_1 = Dimension Index for the Variable 'Mean Years of Adult Education '

I_2 = Dimension Index for the Variable 'Expected Years of Schooling '

$$\text{Human Development Index} : \text{HDI} = (\text{I}_{\text{Life}} \times \text{I}_{\text{Education}} \times \text{I}_{\text{Income}})^{\left(\frac{1}{3}\right)}$$

Name of Attribute	Minimum Value	Maximum Value
Life Expetancy	20	83.2
Mean Years of Adult Education	0	13.2
Expected Years of Schooling	0	20.6
Combined Education Index	0	0.951
Percapita GNI (PcGNI)	163	108211

Related to World Reserve Life Index (WRLI)

'World Reserve Life Index' provides an estimate for the years remaining before a specific world resource is expected to be completely depleted based on certain assumptions. Below are the related formula:

World Reserve Life Index (WRLI): If the the consumption remains fixed as it was in the year T, then the Number years of the year for a complete depletion of the Resource is:

$$\text{WRLI}_{\boxed{T}} = \frac{\text{World Reserve at the End of a Year } \boxed{T}}{\text{World Consumption in the Year } \boxed{T}}$$

$$\text{WR}\mathbf{B}\text{LI}_{\boxed{T}} = \frac{\text{World } \mathbf{Base} \text{ Reserve at the End of a Year } \boxed{T}}{\text{World Consumption in the Year } \boxed{T}}$$

World Reserve Life Index (WRLI): If the the consumption **Increases** by a Annual Average Growth Rate of $\boxed{\text{AAGR}}$ % from the year T, then the Number years of the year for a complete depletion of the Resource is:

$$\text{WRLI}^{*}_{\boxed{T},\ \text{AAGR}} = \frac{\log\left(1+\text{WRLI}_{\boxed{T}} \times \frac{\text{AAGR}}{100+\text{AAGR}}\right)}{\log\left(\frac{100+\text{AAGR}}{100}\right)}$$

World Reserve Life Index (WRLI): If the the consumption **Decreases** by a Annual Average Rate of $\boxed{\text{AAGR}}$ % from the year T, then the Number years of the year for a complete depletion of the Resource is:

- If $\left(1-\text{WRLI}_{\boxed{T}} \times \frac{\text{AAGR}}{100-\text{AAGR}}\right) > 0$, then

$$\text{WRLI}^{*}_{\boxed{T},\ \text{AAGR}} = \frac{\log\left(1-\text{WRLI}_{\boxed{T}} \times \frac{\text{AAGR}}{100-\text{AAGR}}\right)}{\log\left(\frac{100-\text{AAGR}}{100}\right)}$$

- $\left(1-\text{WRLI}_{\boxed{T}} \times \frac{\text{AAGR}}{100-\text{AAGR}}\right) \leq 0$, then the World Reserve on the material is never going to be depleted if we continue to decrease consumption at the specified rate. Eventually (hypothetically) the consumption will be almost zero before the resource gets depleted.

*The above calculation is based on the assumption that $AAGR\% < 100\%$.

!!! All the Best !!!