To calculate the efficiency:

$$\text{Efficiency} = \frac{\sum(\text{Quantity} \times \text{STD})/60}{\text{Shift Time} \times \text{Number of Shifts}}$$

What is in the STD column?

- Each row shows a decimal value like **0.17, 0.32, 0.42, etc.**
- These values are most likely in **minutes per unit** (common in production planning).
- So, for example:
    - If STD = **0.32**, it means **0.32 minutes per piece** for that step.
    - If you produce 100 pieces, the planned time for that step:

100 x 0.32 = 32 minutes

How is it used in the formula?

- The Excel formula uses: SUMPRODUCT (Quantity, STD)
- This multiplies **Quantity (column I)** by **STD (Standard Time per unit)** for each row and sums them up.
- Result = **Total Planned Time (weighted)** in **minutes**.

Why divide by 60?

- Because the SUMPRODUCT result is in **minutes**, dividing by 60 converts it to **hours**.
- Then, this is compared to **Total Available Time** (in hours) to calculate efficiency.

Example Row

- **Quantity** (assume from column I): **100 pieces**
- **STD** (from your image): **0.32 minutes per piece**
- **Shift Time**: **7.67 hours**

- **Number of Shifts**: **18**
- **Normalization Factor**: **60** (to convert minutes → hours)

Step 1: Calculate Total Planned Time (weighted)

$$\text{Total Planned Time} = \text{Quantity} \times \text{STD} = 100 \times 0.32 = 32 \text{ minutes}$$

Step 2: Convert to Hours

$$\text{Adjusted Planned Time} = \frac{32}{60} = 0.533 \text{ hours}$$

Step 3: Total Available Time

$$\text{Available Time} = 7.67 \times 18 = 138.06 \text{ hours}$$

Step 4: Efficiency

$$\text{Efficiency} = \frac{0.533}{138.06} \approx 0.00386 \text{ or } 0.39\%$$

This is for **one row only**. In reality, the formula sums all rows:

$$\text{Efficiency} = \frac{\sum(\text{Quantity} \times \text{STD})/60}{138.06}$$