

Important Time Estimation Formulas PDF



Formulas Examples with Units

List of 16 Important Time Estimation Formulas

1) Early Finish Time Formula ↻

Formula

$$EFT = EST + S$$

Example with Units

$$19.0296d = 19d + 2560$$

Evaluate Formula ↻

2) Expected Waiting Time for Customers in Queue Formula ↻

Formula

$$W_q = \frac{\lambda_a}{\mu \cdot (\mu - \lambda_a)}$$

Example

$$0.0045 = \frac{1800}{2000 \cdot (2000 - 1800)}$$

Evaluate Formula ↻

3) Expected Waiting Time for Customers in System Formula ↻

Formula

$$W_s = \frac{1}{\mu - \lambda_a}$$

Example

$$0.005 = \frac{1}{2000 - 1800}$$

Evaluate Formula ↻

4) Free Float Formula ↻

Formula

$$FF_0 = EFT - EST - t_{\text{activity}}$$

Example with Units

$$7d = 46d - 19d - 20d$$

Evaluate Formula ↻

5) Independent Float Formula ↻

Formula

$$IF_0 = EFT - LST - t_{\text{activity}}$$

Example with Units

$$3d = 46d - 23d - 20d$$

Evaluate Formula ↻

6) Independent Float given Slack Formula ↻

Formula

$$IF_{0 \text{ slack}} = FF_0 - s$$

Example with Units

$$2 = 8d - 6d$$

Evaluate Formula ↻

7) Late Finish Time Formula ↻

Formula

$$LFT = LST + dur$$

Example with Units

$$44d = 23d + 21d$$

Evaluate Formula ↻



8) PERT Expected Time Formula

Formula

$$t_e = \frac{T_{\text{optimistic}} + 4 \cdot t_m + T_{\text{Pessimistic}}}{6}$$

Example with Units

$$5.1667 \text{ d} = \frac{9 \text{ d} + 4 \cdot 3 \text{ d} + 10 \text{ d}}{6}$$

Evaluate Formula 

9) Standard Deviation given Optimistic and Pessimistic Time Formula

Formula

$$\sigma = \frac{T_{\text{Pessimistic}} - T_{\text{optimistic}}}{6}$$

Example with Units

$$0.1667 \text{ d} = \frac{10 \text{ d} - 9 \text{ d}}{6}$$

Evaluate Formula 

10) Standard Normal Variation Formula

Formula

$$Z = \frac{T_z - T_e}{\sigma}$$

Example with Units

$$0.0023 = \frac{170 - 160}{0.05 \text{ d}}$$

Evaluate Formula 

11) Time Taken for Manufacturing Model with Shortage Formula

Formula

$$t_{\text{ms}} = \frac{\text{EOQ}_{\text{ms}}}{D}$$

Example

$$0.05 = \frac{500}{10000}$$

Evaluate Formula 

12) Time Taken for Purchase Model with No Shortage Formula

Formula

$$t_{\text{no shortage}} = \frac{\text{EOQ}}{D}$$

Example

$$0.0045 = \frac{45}{10000}$$

Evaluate Formula 

13) Time Taken for Purchase Model with Shortage Formula

Formula

$$t_{\text{with shortage}} = \frac{\text{EOQ}_{\text{ps}}}{D}$$

Example

$$0.1077 = \frac{1077.033}{10000}$$

Evaluate Formula 

14) Total Float Formula

Formula

$$\text{TF}_0 = \text{LFT} - (\text{EST} + t_{\text{activity}})$$

Example with Units

$$18 \text{ d} = 57 \text{ d} - (19 \text{ d} + 20 \text{ d})$$

Evaluate Formula 

15) Total Float given Finish Time Formula

Formula

$$\text{TF}_{\text{finish}} = \text{LFT} - \text{EFT}$$

Example with Units

$$11 \text{ d} = 57 \text{ d} - 46 \text{ d}$$

Evaluate Formula 



16) Total Float given Start Time Formula

Formula

$$TF_0 = LST - EST$$

Example with Units

$$4d = 23d - 19d$$

Evaluate Formula 



Variables used in list of Time Estimation Formulas above

- μ Mean Service Rate
- **D** Demand per Year
- **dur** Duration of Activity (*Day*)
- **EFT** Early Finish Time (*Day*)
- **EOQ** Economic Order Quantity
- **EOQ_{ms}** EOQ Manufacturing Model with Shortage
- **EOQ_{ps}** EOQ Purchase Model
- **EST** Early Start Time (*Day*)
- **FF₀** Free Float (*Day*)
- **IF_{0 slack}** Independent Float given Slack
- **IF₀** Independent Float (*Day*)
- **LFT** Late Finish Time (*Day*)
- **LST** Late Start Time (*Day*)
- **s** Slack of Event (*Day*)
- **S** Safety Stock
- **t_{activity}** Activity Time (*Day*)
- **t_e** PERT Expected Time (*Day*)
- **T_e** Expected Value
- **t_m** Most Likely Time (*Day*)
- **t_{ms}** Time taken for Manufacturing Model with Shortage
- **t_{no shortage}** Time taken for Purchase Model no Shortage
- **T_{optimistic}** Optimistic Time (*Day*)
- **T_{pessimistic}** Pessimistic Time (*Day*)
- **t_{with shortage}** Time taken for Purchase Model with Shortage
- **T_z** Normal Variate
- **TF₀** Total Float (*Day*)
- **TF_{ofinish}** Total Float given Finish Times (*Day*)
- **W_q** Expected Waiting Time for Customers in Queue

Constants, Functions, Measurements used in list of Time Estimation Formulas above

- **Measurement: Time** in Day (d)
Time Unit Conversion 



- W_s Expected Waiting Time for Customers in System
- Z Standard Normal Variation
- λ_a Mean Arrival Rate
- σ Standard Deviation (*Day*)



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