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# Traversing Formulas

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## List of 12 Traversing Formulas

### Traversing ↗

#### 1) Closing Error in Traversing ↗

**fx**  $e = \sqrt{\sum L^2 + \sum D^2}$

[Open Calculator ↗](#)

**ex**  $50m = \sqrt{(40m)^2 + (30m)^2}$

#### 2) Correction of Latitude by Transit Rule ↗

**fx**  $c_{l/r} = e_{l/r} \cdot \frac{L}{\sum L}$

[Open Calculator ↗](#)

**ex**  $24.5m = 49m \cdot \frac{20m}{40m}$

#### 3) Correction to First Bearing for given Closing Error ↗

**fx**  $c_b = \left( \frac{e}{N_{Sides}} \right) \cdot \left( \frac{\pi}{180} \right)$

[Open Calculator ↗](#)

**ex**  $25^\circ = \left( \frac{50m}{2} \right) \cdot \left( \frac{\pi}{180} \right)$



## 4) Correction to Latitude by Bowditch Rule ↗

$$fx \quad c_{l/r} = e_{l/r} \cdot \frac{L}{P}$$

[Open Calculator ↗](#)

$$ex \quad 11.52941m = 49m \cdot \frac{20m}{85m}$$

## 5) Correction to Northing in Transit Rule ↗

$$fx \quad e = 0.5 \cdot e_{l/r} \cdot \frac{n}{\Sigma n}$$

[Open Calculator ↗](#)

$$ex \quad 51.04167m = 0.5 \cdot 49m \cdot \frac{100m}{48m}$$

## 6) Correction to Second Bearing for given Closing Error ↗

$$fx \quad c_{n2} = \left( 2 \cdot \frac{e}{N_{Sides}} \right) \cdot \left( \frac{\pi}{180} \right)$$

[Open Calculator ↗](#)

$$ex \quad 50^\circ = \left( 2 \cdot \frac{50m}{2} \right) \cdot \left( \frac{\pi}{180} \right)$$

## 7) Direction of Closing Error in Traversing ↗

$$fx \quad \tan\theta = \frac{\Sigma D}{\Sigma L}$$

[Open Calculator ↗](#)

$$ex \quad 0.75 = \frac{30m}{40m}$$



## 8) Sum of Departure given Direction of Closing Error ↗

**fx**  $\Sigma D = \tan\theta \cdot \Sigma L$

[Open Calculator ↗](#)

**ex**  $30m = 0.75 \cdot 40m$

## 9) Sum of Departures given Closing Error ↗

**fx**  $\Sigma D = \sqrt{e^2 - \Sigma L^2}$

[Open Calculator ↗](#)

**ex**  $30m = \sqrt{(50m)^2 - (40m)^2}$

## 10) Sum of Latitudes given Closing Error ↗

**fx**  $\Sigma L = \sqrt{e^2 - \Sigma D^2}$

[Open Calculator ↗](#)

**ex**  $40m = \sqrt{(50m)^2 - (30m)^2}$

## 11) Sum of Latitudes given Direction of Closing Error ↗

**fx**  $\Sigma L = \frac{\Sigma D}{\tan\theta}$

[Open Calculator ↗](#)

**ex**  $40m = \frac{30m}{0.75}$



**12) Total Error in Latitude if Correction is Known from Bowditch Rule** 

$$e_{l/r} = c_{l/r} \cdot \frac{P}{L}$$

**Open Calculator** 

$$48.875m = 11.5m \cdot \frac{85m}{20m}$$



## Variables Used

- $C_b$  Correction to First Bearing (*Degree*)
- $C_{l/r}$  Correction to Latitude (*Meter*)
- $C_{n2}$  Correction to Second Bearing (*Degree*)
- $e$  Closing Error (*Meter*)
- $e_{l/r}$  Error in Latitude (*Meter*)
- $L$  Latitude of Line (*Meter*)
- $n$  Northing (*Meter*)
- $N_{Sides}$  Number of Sides
- $P$  Perimeter of Traverse (*Meter*)
- $\Sigma D$  Sum of Departures (*Meter*)
- $\Sigma L$  Sum of Latitudes (*Meter*)
- $\Sigma n$  Sum of Northings (*Meter*)
- $\tan\theta$  Direction of Closing Error



# Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288  
*Archimedes' constant*
- **Function:** **sqrt**, sqrt(Number)  
*Square root function*
- **Measurement:** **Length** in Meter (m)  
*Length Unit Conversion* ↗
- **Measurement:** **Angle** in Degree ( $^{\circ}$ )  
*Angle Unit Conversion* ↗



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