

# Important Formulas of Isosceles Trapezoid PDF



**Formulas**  
**Examples**  
**with Units**

**List of 29**  
**Important Formulas of Isosceles Trapezoid**

## 1) Area of Isosceles Trapezoid Formulas

### 1.1) Area of Isosceles Trapezoid Formula

Formula

$$A = \left( \frac{B_{\text{Long}} + B_{\text{Short}}}{2} \right) \cdot h$$

Example with Units

$$48\text{m}^2 = \left( \frac{15\text{m} + 9\text{m}}{2} \right) \cdot 4\text{m}$$

Evaluate Formula

### 1.2) Area of Isosceles Trapezoid given Central Median and Height Formula

Formula

$$A = M \cdot h$$

Example with Units

$$48\text{m}^2 = 12\text{m} \cdot 4\text{m}$$

Evaluate Formula

## 2) Central Median of Isosceles Trapezoid Formulas

### 2.1) Central Median of Isosceles Trapezoid Formula

Formula

$$M = \frac{B_{\text{Long}} + B_{\text{Short}}}{2}$$

Example with Units

$$12\text{m} = \frac{15\text{m} + 9\text{m}}{2}$$

Evaluate Formula

### 2.2) Central Median of Isosceles Trapezoid given Lateral Edge and Long Base Formula

Formula

$$M = B_{\text{Long}} - \sqrt{l_{e(\text{Lateral})}^2 - h^2}$$

Example with Units

$$12\text{m} = 15\text{m} - \sqrt{5\text{m}^2 - 4\text{m}^2}$$

Evaluate Formula

### 2.3) Central Median of Isosceles Trapezoid given Lateral Edge and Short Base Formula

Formula

$$M = B_{\text{Short}} + \sqrt{l_{e(\text{Lateral})}^2 - h^2}$$

Example with Units

$$12\text{m} = 9\text{m} + \sqrt{5\text{m}^2 - 4\text{m}^2}$$

Evaluate Formula

### 3) Circumradius of Isosceles Trapezoid Formulas

#### 3.1) Circumradius of Isosceles Trapezoid Formula

Formula

$$r_c = \frac{l_{e(\text{Lateral})} \cdot \sqrt{(B_{\text{Long}} \cdot B_{\text{Short}}) + l_{e(\text{Lateral})}^2}}{\sqrt{(4 \cdot l_{e(\text{Lateral})}^2) - (B_{\text{Long}} - B_{\text{Short}})^2}}$$

Evaluate Formula 

Example with Units

$$7.9057 \text{ m} = \frac{5 \text{ m} \cdot \sqrt{(15 \text{ m} \cdot 9 \text{ m}) + 5 \text{ m}^2}}{\sqrt{(4 \cdot 5 \text{ m}^2) - (15 \text{ m} - 9 \text{ m})^2}}$$

#### 3.2) Circumradius of Isosceles Trapezoid given Diagonal Formula

Formula

$$r_c = d \cdot \frac{\sqrt{d^2 - (B_{\text{Long}} \cdot B_{\text{Short}})}}{\sqrt{(4 \cdot d^2) - (B_{\text{Long}} + B_{\text{Short}})^2}}$$

Evaluate Formula 

Example with Units

$$7.5802 \text{ m} = 13 \text{ m} \cdot \frac{\sqrt{13 \text{ m}^2 - (15 \text{ m} \cdot 9 \text{ m})}}{\sqrt{(4 \cdot 13 \text{ m}^2) - (15 \text{ m} + 9 \text{ m})^2}}$$

### 4) Diagonal of Isosceles Trapezoid Formulas

#### 4.1) Diagonal of Isosceles Trapezoid Formula

Formula

$$d = \sqrt{(B_{\text{Long}} \cdot B_{\text{Short}}) + l_{e(\text{Lateral})}^2}$$

Example with Units

$$12.6491 \text{ m} = \sqrt{(15 \text{ m} \cdot 9 \text{ m}) + 5 \text{ m}^2}$$

Evaluate Formula 

#### 4.2) Diagonal of Isosceles Trapezoid given Central Median and Height Formula

Formula

$$d = \sqrt{h^2 + M^2}$$

Example with Units

$$12.6491 \text{ m} = \sqrt{4 \text{ m}^2 + 12 \text{ m}^2}$$

Evaluate Formula 



### 4.3) Diagonal of Isosceles Trapezoid given Height Formula

Formula

$$d = \sqrt{h^2 + \frac{(B_{\text{Long}} + B_{\text{Short}})^2}{4}}$$

Example with Units

$$12.6491\text{m} = \sqrt{4\text{m}^2 + \frac{(15\text{m} + 9\text{m})^2}{4}}$$

Evaluate Formula 

## 5) Edges of Isosceles Trapezoid Formulas

### 5.1) Lateral Edge of Isosceles Trapezoid given Diagonal Formula

Formula

$$l_{e(\text{Lateral})} = \sqrt{d^2 - (B_{\text{Long}} \cdot B_{\text{Short}})}$$

Example with Units

$$5.831\text{m} = \sqrt{13\text{m}^2 - (15\text{m} \cdot 9\text{m})}$$

Evaluate Formula 

### 5.2) Lateral Edge of Isosceles Trapezoid given Height and Acute Angle Formula

Formula

$$l_{e(\text{Lateral})} = \frac{h}{\sin(\angle_{\text{Acute}})}$$

Example with Units

$$4.8831\text{m} = \frac{4\text{m}}{\sin(55^\circ)}$$

Evaluate Formula 

### 5.3) Lateral Edge of Isosceles Trapezoid given Long and Short Base Formula

Formula

$$l_{e(\text{Lateral})} = \frac{B_{\text{Long}} - B_{\text{Short}}}{2 \cdot \cos(\angle_{\text{Acute}})}$$

Example with Units

$$5.2303\text{m} = \frac{15\text{m} - 9\text{m}}{2 \cdot \cos(55^\circ)}$$

Evaluate Formula 

### 5.4) Long Base of Isosceles Trapezoid given Area Formula

Formula

$$B_{\text{Long}} = \frac{2 \cdot A}{h} - B_{\text{Short}}$$

Example with Units

$$16\text{m} = \frac{2 \cdot 50\text{m}^2}{4\text{m}} - 9\text{m}$$

Evaluate Formula 

### 5.5) Long Base of Isosceles Trapezoid given Diagonal Formula

Formula

$$B_{\text{Long}} = \frac{d^2 - l_{e(\text{Lateral})}^2}{B_{\text{Short}}}$$

Example with Units

$$16\text{m} = \frac{13\text{m}^2 - 5\text{m}^2}{9\text{m}}$$

Evaluate Formula 

### 5.6) Long Base of Isosceles Trapezoid given Height Formula

Formula

$$B_{\text{Long}} = B_{\text{Short}} + (2 \cdot h \cdot \cot(\angle_{\text{Acute}}))$$

Example with Units

$$14.6017\text{m} = 9\text{m} + (2 \cdot 4\text{m} \cdot \cot(55^\circ))$$

Evaluate Formula 



## 5.7) Long Base of Isosceles Trapezoid given Lateral Edge Formula ↻

Formula

$$B_{\text{Long}} = B_{\text{Short}} + \left( 2 \cdot l_{e(\text{Lateral})} \cdot \cos(\angle_{\text{Acute}}) \right)$$

Evaluate Formula ↻

Example with Units

$$14.7358\text{m} = 9\text{m} + \left( 2 \cdot 5\text{m} \cdot \cos(55^\circ) \right)$$

## 5.8) Long Base of Isosceles Trapezoid given Perimeter Formula ↻

Formula

$$B_{\text{Long}} = P - \left( B_{\text{Short}} + \left( 2 \cdot l_{e(\text{Lateral})} \right) \right)$$

Example with Units

$$16\text{m} = 35\text{m} - \left( 9\text{m} + \left( 2 \cdot 5\text{m} \right) \right)$$

Evaluate Formula ↻

## 5.9) Short Base of Isosceles Trapezoid given Area Formula ↻

Formula

$$B_{\text{Short}} = \frac{2 \cdot A}{h} - B_{\text{Long}}$$

Example with Units

$$10\text{m} = \frac{2 \cdot 50\text{m}^2}{4\text{m}} - 15\text{m}$$

Evaluate Formula ↻

## 5.10) Short Base of Isosceles Trapezoid given Diagonal Formula ↻

Formula

$$B_{\text{Short}} = \frac{d^2 - l_{e(\text{Lateral})}^2}{B_{\text{Long}}}$$

Example with Units

$$9.6\text{m} = \frac{13\text{m}^2 - 5\text{m}^2}{15\text{m}}$$

Evaluate Formula ↻

## 5.11) Short Base of Isosceles Trapezoid given Height Formula ↻

Formula

$$B_{\text{Short}} = B_{\text{Long}} - \left( 2 \cdot h \cdot \cot(\angle_{\text{Acute}}) \right)$$

Example with Units

$$9.3983\text{m} = 15\text{m} - \left( 2 \cdot 4\text{m} \cdot \cot(55^\circ) \right)$$

Evaluate Formula ↻

## 5.12) Short Base of Isosceles Trapezoid given Lateral Edge Formula ↻

Formula

$$B_{\text{Short}} = B_{\text{Long}} - \left( 2 \cdot l_{e(\text{Lateral})} \cdot \cos(\angle_{\text{Acute}}) \right)$$

Evaluate Formula ↻

Example with Units

$$9.2642\text{m} = 15\text{m} - \left( 2 \cdot 5\text{m} \cdot \cos(55^\circ) \right)$$

## 5.13) Short Base of Isosceles Trapezoid given Perimeter Formula ↻

Formula

$$B_{\text{Short}} = P - \left( B_{\text{Long}} + \left( 2 \cdot l_{e(\text{Lateral})} \right) \right)$$

Example with Units

$$10\text{m} = 35\text{m} - \left( 15\text{m} + \left( 2 \cdot 5\text{m} \right) \right)$$

Evaluate Formula ↻



## 6) Height of Isosceles Trapezoid Formulas ↻

### 6.1) Height of Isosceles Trapezoid Formula ↻

Formula

$$h = \frac{1}{2} \cdot \sqrt{\left(4 \cdot l_{e(\text{Lateral})}^2\right) - \left(B_{\text{Long}} - B_{\text{Short}}\right)^2}$$

Evaluate Formula ↻

Example with Units

$$4\text{ m} = \frac{1}{2} \cdot \sqrt{\left(4 \cdot 5\text{ m}^2\right) - \left(15\text{ m} - 9\text{ m}\right)^2}$$

### 6.2) Height of Isosceles Trapezoid given Area Formula ↻

Formula

$$h = \frac{2 \cdot A}{B_{\text{Long}} + B_{\text{Short}}}$$

Example with Units

$$4.1667\text{ m} = \frac{2 \cdot 50\text{ m}^2}{15\text{ m} + 9\text{ m}}$$

Evaluate Formula ↻

### 6.3) Height of Isosceles Trapezoid given Lateral Edge and Acute Angle Formula ↻

Formula

$$h = l_{e(\text{Lateral})} \cdot \sin(\angle_{\text{Acute}})$$

Example with Units

$$4.0958\text{ m} = 5\text{ m} \cdot \sin(55^\circ)$$

Evaluate Formula ↻

### 6.4) Height of Isosceles Trapezoid given Long and Short Base Formula ↻

Formula

$$h = \left(\frac{B_{\text{Long}} - B_{\text{Short}}}{2}\right) \cdot \tan(\angle_{\text{Acute}})$$

Example with Units

$$4.2844\text{ m} = \left(\frac{15\text{ m} - 9\text{ m}}{2}\right) \cdot \tan(55^\circ)$$

Evaluate Formula ↻

## 7) Perimeter of Isosceles Trapezoid Formulas ↻

### 7.1) Perimeter of Isosceles Trapezoid Formula ↻

Formula

$$P = B_{\text{Long}} + B_{\text{Short}} + (2 \cdot l_{e(\text{Lateral})})$$

Example with Units

$$34\text{ m} = 15\text{ m} + 9\text{ m} + (2 \cdot 5\text{ m})$$

Evaluate Formula ↻

### 7.2) Perimeter of Isosceles Trapezoid given Central Median Formula ↻

Formula

$$P = 2 \cdot (l_{e(\text{Lateral})} + M)$$

Example with Units

$$34\text{ m} = 2 \cdot (5\text{ m} + 12\text{ m})$$




Evaluate Formula ↻













































## Variables used in list of Important Formulas of Isosceles Trapezoid above

- $\angle$  **Acute** Acute Angle of Isosceles Trapezoid (Degree)
- **A** Area of Isosceles Trapezoid (Square Meter)
- **B<sub>Long</sub>** Long Base of Isosceles Trapezoid (Meter)
- **B<sub>Short</sub>** Short Base of Isosceles Trapezoid (Meter)
- **d** Diagonal of Isosceles Trapezoid (Meter)
- **h** Height of Isosceles Trapezoid (Meter)
- **l<sub>e</sub>(Lateral)** Lateral Edge of Isosceles Trapezoid (Meter)
- **M** Central Median of Isosceles Trapezoid (Meter)
- **P** Perimeter of Isosceles Trapezoid (Meter)
- **r<sub>C</sub>** Circumradius of Isosceles Trapezoid (Meter)

## Constants, Functions, Measurements used in list of Important Formulas of Isosceles Trapezoid above

- **Functions: cos**,  $\cos(\text{Angle})$   
*Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.*
- **Functions: cot**,  $\cot(\text{Angle})$   
*Cotangent is a trigonometric function that is defined as the ratio of the adjacent side to the opposite side in a right triangle.*
- **Functions: sin**,  $\sin(\text{Angle})$   
*Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.*
- **Functions: sqrt**,  $\text{sqrt}(\text{Number})$   
*A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.*
- **Functions: tan**,  $\tan(\text{Angle})$   
*The tangent of an angle is a trigonometric ratio of the length of the side opposite an angle to the length of the side adjacent to an angle in a right triangle.*
- **Measurement: Length** in Meter (m)  
*Length Unit Conversion* 
- **Measurement: Area** in Square Meter (m<sup>2</sup>)  
*Area Unit Conversion* 
- **Measurement: Angle** in Degree (°)  
*Angle Unit Conversion* 



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