

Important Formulas of Trapezoid PDF



Formulas Examples with Units

List of 30 Important Formulas of Trapezoid

1) Area of Trapezoid Formula ↻

Formula

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

Example with Units

$$80 \text{ m}^2 = \left(\frac{5 \text{ m} + 15 \text{ m}}{2} \right) \cdot 8 \text{ m}$$

Evaluate Formula ↻

2) Inradius of Trapezoid Formula ↻

Formula

$$r_i = \frac{h}{2}$$

Example with Units

$$4 \text{ m} = \frac{8 \text{ m}}{2}$$

Evaluate Formula ↻

3) Perimeter of Trapezoid Formula ↻

Formula

$$P = B_{\text{Short}} + B_{\text{Long}} + L_{\text{Short}} + L_{\text{Long}}$$

Example with Units

$$40 \text{ m} = 5 \text{ m} + 15 \text{ m} + 9 \text{ m} + 11 \text{ m}$$

Evaluate Formula ↻

4) X Coordinate of Centroid of Trapezoid Formula ↻

Formula

$$G_x = \left(\frac{B_{\text{Long}} + 2 \cdot B_{\text{Short}}}{3 \cdot (B_{\text{Short}} + B_{\text{Long}})} \right) \cdot h$$

Example with Units

$$3.3333 \text{ m} = \left(\frac{15 \text{ m} + 2 \cdot 5 \text{ m}}{3 \cdot (5 \text{ m} + 15 \text{ m})} \right) \cdot 8 \text{ m}$$

Evaluate Formula ↻

5) Central Median of Trapezoid Formulas ↻

5.1) Central Median of Trapezoid Formula ↻

Formula

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

Example with Units

$$10 \text{ m} = \frac{15 \text{ m} + 5 \text{ m}}{2}$$

Evaluate Formula ↻



5.2) Central Median of Trapezoid given Height, and Long Base Formula

Formula

Evaluate Formula 

$$M = B_{\text{Long}} - \left(h \cdot \frac{\cot(\angle_{\text{Smaller Acute}}) + \cot(\angle_{\text{Larger Acute}})}{2} \right)$$

Example with Units

$$10.1877_{\text{m}} = 15_{\text{m}} - \left(8_{\text{m}} \cdot \frac{\cot(50^\circ) + \cot(70^\circ)}{2} \right)$$

5.3) Central Median of Trapezoid given Height, and Short Base Formula

Formula

Evaluate Formula 

$$M = B_{\text{Short}} + \left(h \cdot \frac{\cot(\angle_{\text{Smaller Acute}}) + \cot(\angle_{\text{Larger Acute}})}{2} \right)$$

Example with Units

$$9.8123_{\text{m}} = 5_{\text{m}} + \left(8_{\text{m}} \cdot \frac{\cot(50^\circ) + \cot(70^\circ)}{2} \right)$$

6) Diagonal of Trapezoid Formulas

6.1) Long Diagonal of Trapezoid Formula

Formula

Evaluate Formula 

$$d_{\text{Long}} = \sqrt{B_{\text{Long}}^2 + L_{\text{Short}}^2 - (2 \cdot B_{\text{Long}} \cdot L_{\text{Short}} \cdot \cos(\angle_{\text{Larger Acute}}))}$$

Example with Units

$$14.6169_{\text{m}} = \sqrt{15_{\text{m}}^2 + 9_{\text{m}}^2 - (2 \cdot 15_{\text{m}} \cdot 9_{\text{m}} \cdot \cos(70^\circ))}$$

6.2) Long Diagonal of Trapezoid given all Sides Formula

Formula

Evaluate Formula 

$$d_{\text{Long}} = \sqrt{L_{\text{Short}}^2 + (B_{\text{Short}} \cdot B_{\text{Long}}) - \left(B_{\text{Long}} \cdot \frac{L_{\text{Short}}^2 - L_{\text{Long}}^2}{B_{\text{Long}} - B_{\text{Short}}} \right)}$$

Example with Units

$$14.6969_{\text{m}} = \sqrt{9_{\text{m}}^2 + (5_{\text{m}} \cdot 15_{\text{m}}) - \left(15_{\text{m}} \cdot \frac{9_{\text{m}}^2 - 11_{\text{m}}^2}{15_{\text{m}} - 5_{\text{m}}} \right)}$$



6.3) Long Diagonal of Trapezoid given Short Diagonal Formula ↻

Formula

$$d_{\text{Long}} = \frac{h \cdot (B_{\text{Long}} + B_{\text{Short}})}{d_{\text{Short}} \cdot \sin(\angle_{\text{d(Leg)}})}$$

Example with Units

$$13.539 \text{ m} = \frac{8 \text{ m} \cdot (15 \text{ m} + 5 \text{ m})}{12 \text{ m} \cdot \sin(80^\circ)}$$

Evaluate Formula ↻

6.4) Short Diagonal of Trapezoid Formula ↻

Formula

$$d_{\text{Short}} = \sqrt{B_{\text{Long}}^2 + L_{\text{Long}}^2 - (2 \cdot B_{\text{Long}} \cdot L_{\text{Long}} \cdot \cos(\angle_{\text{Smaller Acute}}))}$$

Example with Units

$$11.5707 \text{ m} = \sqrt{15 \text{ m}^2 + 11 \text{ m}^2 - (2 \cdot 15 \text{ m} \cdot 11 \text{ m} \cdot \cos(50^\circ))}$$

Evaluate Formula ↻

6.5) Short Diagonal of Trapezoid given all Sides Formula ↻

Formula

$$d_{\text{Short}} = \sqrt{L_{\text{Long}}^2 + (B_{\text{Short}} \cdot B_{\text{Long}}) - \left(B_{\text{Long}} \cdot \frac{L_{\text{Long}}^2 - L_{\text{Short}}^2}{B_{\text{Long}} - B_{\text{Short}}} \right)}$$

Example with Units

$$11.6619 \text{ m} = \sqrt{11 \text{ m}^2 + (5 \text{ m} \cdot 15 \text{ m}) - \left(15 \text{ m} \cdot \frac{11 \text{ m}^2 - 9 \text{ m}^2}{15 \text{ m} - 5 \text{ m}} \right)}$$

Evaluate Formula ↻

6.6) Short Diagonal of Trapezoid given Long Diagonal Formula ↻

Formula

$$d_{\text{Short}} = \frac{h \cdot (B_{\text{Long}} + B_{\text{Short}})}{d_{\text{Long}} \cdot \sin(\angle_{\text{d(Leg)}})}$$

Example with Units

$$11.6049 \text{ m} = \frac{8 \text{ m} \cdot (15 \text{ m} + 5 \text{ m})}{14 \text{ m} \cdot \sin(80^\circ)}$$

Evaluate Formula ↻



7) Height of Trapezoid Formulas

7.1) Height of Trapezoid Formula

Formula

Evaluate Formula

$$h = \sqrt{L_{\text{Long}}^2 - \left(\frac{(B_{\text{Long}} - B_{\text{Short}})^2 + L_{\text{Long}}^2 - L_{\text{Short}}^2}{2 \cdot (B_{\text{Long}} - B_{\text{Short}})} \right)^2}$$

Example with Units

$$8.4853 \text{ m} = \sqrt{11 \text{ m}^2 - \left(\frac{(15 \text{ m} - 5 \text{ m})^2 + 11 \text{ m}^2 - 9 \text{ m}^2}{2 \cdot (15 \text{ m} - 5 \text{ m})} \right)^2}$$

7.2) Height of Trapezoid given Area Formula

Formula

Example with Units

Evaluate Formula

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

$$8.5 \text{ m} = \frac{2 \cdot 85 \text{ m}^2}{15 \text{ m} + 5 \text{ m}}$$

7.3) Height of Trapezoid given Both Diagonals and Leg Angle between Diagonals Formula

Formula

Example with Units

Evaluate Formula

$$h = \frac{d_{\text{Long}} \cdot d_{\text{Short}}}{B_{\text{Long}} + B_{\text{Short}}} \cdot \sin(\angle_{\text{d(Leg)}})$$

$$8.2724 \text{ m} = \frac{14 \text{ m} \cdot 12 \text{ m}}{15 \text{ m} + 5 \text{ m}} \cdot \sin(80^\circ)$$

7.4) Height of Trapezoid given Long Leg Formula

Formula

Example with Units

Evaluate Formula

$$h = L_{\text{Long}} \cdot \sin(\angle_{\text{Smaller Acute}})$$

$$8.4265 \text{ m} = 11 \text{ m} \cdot \sin(50^\circ)$$

7.5) Height of Trapezoid given Short Leg Formula

Formula

Example with Units

Evaluate Formula

$$h = L_{\text{Short}} \cdot \sin(\angle_{\text{Larger Acute}})$$

$$8.4572 \text{ m} = 9 \text{ m} \cdot \sin(70^\circ)$$

8) Sides of Trapezoid Formulas

8.1) Long Base of Trapezoid Formula

Formula

Example with Units

Evaluate Formula

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

$$16.25 \text{ m} = \frac{2 \cdot 85 \text{ m}^2}{8 \text{ m}} - 5 \text{ m}$$



8.2) Long Base of Trapezoid given Long Leg Formula

Formula

$$B_{\text{Long}} = B_{\text{Short}} + \left(L_{\text{Long}} \cdot \frac{\sin(\angle_{\text{Smaller Acute}} + \angle_{\text{Larger Acute}})}{\sin(\angle_{\text{Larger Acute}})} \right)$$

Evaluate Formula 

Example with Units

$$15.1377 \text{ m} = 5 \text{ m} + \left(11 \text{ m} \cdot \frac{\sin(50^\circ + 70^\circ)}{\sin(70^\circ)} \right)$$

8.3) Long Base of Trapezoid given Short Leg Formula

Formula

$$B_{\text{Long}} = B_{\text{Short}} + \left(L_{\text{Short}} \cdot \frac{\sin(\angle_{\text{Smaller Acute}} + \angle_{\text{Larger Acute}})}{\sin(\angle_{\text{Smaller Acute}})} \right)$$

Evaluate Formula 

Example with Units

$$15.1746 \text{ m} = 5 \text{ m} + \left(9 \text{ m} \cdot \frac{\sin(50^\circ + 70^\circ)}{\sin(50^\circ)} \right)$$

8.4) Long Leg of Trapezoid Formula

Formula

$$L_{\text{Long}} = P - (B_{\text{Long}} + B_{\text{Short}} + L_{\text{Short}})$$

Example with Units

$$11 \text{ m} = 40 \text{ m} - (15 \text{ m} + 5 \text{ m} + 9 \text{ m})$$

Evaluate Formula 

8.5) Long Leg of Trapezoid given Height Formula

Formula

$$L_{\text{Long}} = \frac{h}{\sin(\angle_{\text{Smaller Acute}})}$$

Example with Units

$$10.4433 \text{ m} = \frac{8 \text{ m}}{\sin(50^\circ)}$$

Evaluate Formula 

8.6) Long Leg of Trapezoid given Short Leg Formula

Formula

$$L_{\text{Long}} = L_{\text{Short}} \cdot \frac{\sin(\angle_{\text{Larger Acute}})}{\sin(\angle_{\text{Smaller Acute}})}$$

Example with Units

$$11.0401 \text{ m} = 9 \text{ m} \cdot \frac{\sin(70^\circ)}{\sin(50^\circ)}$$

Evaluate Formula 

8.7) Short Base of Trapezoid Formula

Formula

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

Example with Units

$$6.25 \text{ m} = \frac{2 \cdot 85 \text{ m}^2}{8 \text{ m}} - 15 \text{ m}$$

Evaluate Formula 



8.8) Short Base of Trapezoid given Long Leg Formula

Formula

$$B_{\text{Short}} = B_{\text{Long}} - \left(L_{\text{Long}} \cdot \frac{\sin(\angle_{\text{Smaller Acute}} + \angle_{\text{Larger Acute}})}{\sin(\angle_{\text{Larger Acute}})} \right)$$

Evaluate Formula 

Example with Units

$$4.8623 \text{ m} = 15 \text{ m} - \left(11 \text{ m} \cdot \frac{\sin(50^\circ + 70^\circ)}{\sin(70^\circ)} \right)$$

8.9) Short Base of Trapezoid given Short Leg Formula

Formula

$$B_{\text{Short}} = B_{\text{Long}} - \left(L_{\text{Short}} \cdot \frac{\sin(\angle_{\text{Smaller Acute}} + \angle_{\text{Larger Acute}})}{\sin(\angle_{\text{Smaller Acute}})} \right)$$

Evaluate Formula 

Example with Units

$$4.8254 \text{ m} = 15 \text{ m} - \left(9 \text{ m} \cdot \frac{\sin(50^\circ + 70^\circ)}{\sin(50^\circ)} \right)$$

8.10) Short Leg of Trapezoid Formula

Formula

$$L_{\text{Short}} = P - (B_{\text{Long}} + B_{\text{Short}} + L_{\text{Long}})$$

Example with Units

$$9 \text{ m} = 40 \text{ m} - (15 \text{ m} + 5 \text{ m} + 11 \text{ m})$$

Evaluate Formula 

8.11) Short Leg of Trapezoid given Height Formula

Formula

$$L_{\text{Short}} = \frac{h}{\sin(\angle_{\text{Larger Acute}})}$$

Example with Units

$$8.5134 \text{ m} = \frac{8 \text{ m}}{\sin(70^\circ)}$$

Evaluate Formula 

8.12) Short Leg of Trapezoid given Long Leg Formula

Formula

$$L_{\text{Short}} = L_{\text{Long}} \cdot \frac{\sin(\angle_{\text{Smaller Acute}})}{\sin(\angle_{\text{Larger Acute}})}$$

Example with Units

$$8.9673 \text{ m} = 11 \text{ m} \cdot \frac{\sin(50^\circ)}{\sin(70^\circ)}$$

Evaluate Formula 



Variables used in list of Important Formulas of Trapezoid above

- $\angle d(\text{Leg})$ Leg Angle of Trapezoid (Degree)
- $\angle \text{Larger Acute}$ Larger Acute Angle of Trapezoid (Degree)
- $\angle \text{Smaller Acute}$ Smaller Acute Angle of Trapezoid (Degree)
- **A** Area of Trapezoid (Square Meter)
- **B_{Long}** Long Base of Trapezoid (Meter)
- **B_{Short}** Short Base of Trapezoid (Meter)
- **d_{Long}** Long Diagonal of Trapezoid (Meter)
- **d_{Short}** Short Diagonal of Trapezoid (Meter)
- **G_x** X Coordinate of Centroid of Trapezoid (Meter)
- **h** Height of Trapezoid (Meter)
- **L_{Long}** Long Leg of Trapezoid (Meter)
- **L_{Short}** Short Leg of Trapezoid (Meter)
- **M** Central Median of Trapezoid (Meter)
- **P** Perimeter of Trapezoid (Meter)
- **r_i** Inradius of Trapezoid (Meter)

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

- **Functions:** **cos**, cos(Angle)
Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.
- **Functions:** **cot**, cot(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(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**, sqrt(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.
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion 
- **Measurement:** **Area** in Square Meter (m²)
Area Unit Conversion 
- **Measurement:** **Angle** in Degree (°)
Angle Unit Conversion 



- [Important Annulus Formulas](#) 
- [Important Antiparallelogram Formulas](#) 
- [Important Arrow Hexagon Formulas](#) 
- [Important Astroid Formulas](#) 
- [Important Bulge Formulas](#) 
- [Important Cardioid Formulas](#) 
- [Important Circular Arc Quadrangle Formulas](#) 
- [Important Concave Pentagon Formulas](#) 
- [Important Concave Regular Hexagon Formulas](#) 
- [Important Concave Regular Pentagon Formulas](#) 
- [Important Crossed Rectangle Formulas](#) 
- [Important Cut Rectangle Formulas](#) 
- [Important Cyclic Quadrilateral Formulas](#) 
- [Important Cycloid Formulas](#) 
- [Important Decagon Formulas](#) 
- [Important Dodecagon Formulas](#) 
- [Important Double Cycloid Formulas](#) 
- [Important Fourstar Formulas](#) 
- [Important Frame Formulas](#) 
- [Important Golden Rectangle Formulas](#) 
- [Important Grid Formulas](#) 
- [Important H Shape Formulas](#) 
- [Important Half Yin-Yang Formulas](#) 
- [Important Heart Shape Formulas](#) 
- [Important Hendecagon Formulas](#) 
- [Important Heptagon Formulas](#) 
- [Important Hexadecagon Formulas](#) 
- [Important Hexagon Formulas](#) 
- [Important Hexagram Formulas](#) 
- [Important House Shape Formulas](#) 
- [Important Hyperbola Formulas](#) 
- [Important Hypocycloid Formulas](#) 
- [Important Isosceles Trapezoid Formulas](#) 
- [Important L Shape Formulas](#) 
- [Important Line Formulas](#) 
- [Important N-gon Formulas](#) 
- [Important Nonagon Formulas](#) 
- [Important Octagon Formulas](#) 
- [Important Octagram Formulas](#) 
- [Important Open Frame Formulas](#) 
- [Important Parallelogram Formulas](#) 
- [Important Pentagon Formulas](#) 
- [Important Pentagram Formulas](#) 
- [Important Polygram Formulas](#) 
- [Important Quadrilateral Formulas](#) 
- [Important Quarter Circle Formulas](#) 
- [Important Rectangle Formulas](#) 
- [Important Rectangular Hexagon Formulas](#) 
- [Important Regular Polygon Formulas](#) 
- [Important Reuleaux Triangle Formulas](#) 
- [Important Rhombus Formulas](#) 
- [Important Right Trapezoid Formulas](#) 
- [Important Round Corner Formulas](#) 
- [Important Salinon Formulas](#) 



- [Important Semicircle Formulas](#) 
- [Important Sharp Kink Formulas](#) 
- [Important Square Formulas](#) 
- [Important Star of Lakshmi Formulas](#) 
- [Important T Shape Formulas](#) 
- [Important Tangential Quadrilateral Formulas](#) 
- [Important Trapezoid Formulas](#) 
- [Important Tri-equilateral Trapezoid Formulas](#) 
- [Important Truncated Square Formulas](#) 
- [Important Unicursal Hexagram Formulas](#) 
- [Important X Shape Formulas](#) 

Try our Unique Visual Calculators

-  [Percentage share](#) 
-  [HCF of two numbers](#) 
-  [Improper fraction](#) 

Please SHARE this PDF with someone who needs it!

This PDF can be downloaded in these languages

[English](#) [Spanish](#) [French](#) [German](#) [Russian](#) [Italian](#) [Portuguese](#) [Polish](#) [Dutch](#)

7/9/2024 | 1:03:06 PM UTC

