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Important Formulas of Isosceles Trapezoid

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List of 29 Important Formulas of Isosceles Trapezoid

Important Formulas of Isosceles Trapezoid

Area of Isosceles Trapezoid

1) Area of Isosceles Trapezoid

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

[Open Calculator !\[\]\(de95854c7ee024cfadc48187bbb781b2_img.jpg\)](#)

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

2) Area of Isosceles Trapezoid given Central Median and Height

$$fx \quad A = M \cdot h$$

[Open Calculator !\[\]\(6a9b39b98eb945faa14c645ec99e4eaa_img.jpg\)](#)

$$ex \quad 48m^2 = 12m \cdot 4m$$



Central Median of Isosceles Trapezoid

3) Central Median of Isosceles Trapezoid

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

[Open Calculator !\[\]\(a03a7eb2f4046e1d3c76772003e549ea_img.jpg\)](#)

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

4) Central Median of Isosceles Trapezoid given Lateral Edge and Long Base

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

[Open Calculator !\[\]\(5361750c22c4e047a52f4eac1ec2d4cc_img.jpg\)](#)

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

5) Central Median of Isosceles Trapezoid given Lateral Edge and Short Base

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

[Open Calculator !\[\]\(b792654f2cef9719eabeb6c5be00811e_img.jpg\)](#)

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



Circumradius of Isosceles Trapezoid

6) Circumradius of Isosceles Trapezoid

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

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

$$\text{ex } 7.905694\text{m} = \frac{(5\text{m}) \cdot \sqrt{(15\text{m} \cdot 9\text{m}) + (5\text{m})^2}}{\sqrt{(4 \cdot (5\text{m})^2) - (15\text{m} - 9\text{m})^2}}$$

7) Circumradius of Isosceles Trapezoid given Diagonal

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

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

$$\text{ex } 7.580237\text{m} = (13\text{m}) \cdot \frac{\sqrt{(13\text{m})^2 - (15\text{m} \cdot 9\text{m})}}{\sqrt{(4 \cdot (13\text{m})^2) - (15\text{m} + 9\text{m})^2}}$$



Diagonal of Isosceles Trapezoid

8) Diagonal of Isosceles Trapezoid

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

[Open Calculator !\[\]\(74d4806277d7e73349d8e8c0897931e9_img.jpg\)](#)

$$ex \quad 12.64911m = \sqrt{(15m \cdot 9m) + (5m)^2}$$

9) Diagonal of Isosceles Trapezoid given Central Median and Height

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

[Open Calculator !\[\]\(8bba887393ca45b761e5cb49e755e762_img.jpg\)](#)

$$ex \quad 12.64911m = \sqrt{(4m)^2 + (12m)^2}$$

10) Diagonal of Isosceles Trapezoid given Height

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

[Open Calculator !\[\]\(0fb13ad0bfa3d86868cdd3883e5665b3_img.jpg\)](#)

$$ex \quad 12.64911m = \sqrt{(4m)^2 + \frac{(15m + 9m)^2}{4}}$$



Edges of Isosceles Trapezoid

11) Lateral Edge of Isosceles Trapezoid given Diagonal

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

[Open Calculator !\[\]\(950a62bbddad88d64435fd35607dfc42_img.jpg\)](#)

$$\text{ex } 5.830952\text{m} = \sqrt{(13\text{m})^2 - (15\text{m} \cdot 9\text{m})}$$

12) Lateral Edge of Isosceles Trapezoid given Height and Acute Angle

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

[Open Calculator !\[\]\(73002692dd5e7a64e60946be3158e719_img.jpg\)](#)

$$\text{ex } 4.883098\text{m} = \frac{4\text{m}}{\sin(55^\circ)}$$

13) Lateral Edge of Isosceles Trapezoid given Long and Short Base

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

[Open Calculator !\[\]\(104fbf564e2e5a8fbd84f31656d114c7_img.jpg\)](#)

$$\text{ex } 5.23034\text{m} = \frac{15\text{m} - 9\text{m}}{2 \cdot \cos(55^\circ)}$$



14) Long Base of Isosceles Trapezoid given Area 

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

Open Calculator 

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

15) Long Base of Isosceles Trapezoid given Diagonal 

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

Open Calculator 

$$ex \quad 16m = \frac{(13m)^2 - (5m)^2}{9m}$$

16) Long Base of Isosceles Trapezoid given Height 

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

Open Calculator 

$$ex \quad 14.60166m = 9m + (2 \cdot 4m \cdot \cot(55^\circ))$$

17) Long Base of Isosceles Trapezoid given Lateral Edge 

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

Open Calculator 

$$ex \quad 14.73576m = 9m + (2 \cdot 5m \cdot \cos(55^\circ))$$



18) Long Base of Isosceles Trapezoid given Perimeter 

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

Open Calculator 

$$ex \quad 16m = 35m - (9m + (2 \cdot 5m))$$

19) Short Base of Isosceles Trapezoid given Area 

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

Open Calculator 

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

20) Short Base of Isosceles Trapezoid given Diagonal 

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

Open Calculator 

$$ex \quad 9.6m = \frac{(13m)^2 - (5m)^2}{15m}$$

21) Short Base of Isosceles Trapezoid given Height 

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

Open Calculator 

$$ex \quad 9.39834m = 15m - (2 \cdot 4m \cdot \cot(55^\circ))$$



22) Short Base of Isosceles Trapezoid given Lateral Edge 

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

[Open Calculator !\[\]\(c3d993ca47bfe2a953c700506ce31fa0_img.jpg\)](#)


$$\text{ex } 9.264236\text{m} = 15\text{m} - (2 \cdot 5\text{m} \cdot \cos(55^\circ))$$

23) Short Base of Isosceles Trapezoid given Perimeter 

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

[Open Calculator !\[\]\(17413706fd4997a1a4bdf85c6864eee1_img.jpg\)](#)

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

Height of Isosceles Trapezoid 24) Height of Isosceles Trapezoid 

fx

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

[Open Calculator !\[\]\(b4eeff342f60cc7bcd67d869b4fedca2_img.jpg\)](#)

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

25) Height of Isosceles Trapezoid given Area 

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

[Open Calculator !\[\]\(1f56542a42e2413e44a2b2023033aa2e_img.jpg\)](#)

$$\text{ex } 4.166667\text{m} = \frac{2 \cdot 50\text{m}^2}{15\text{m} + 9\text{m}}$$



26) Height of Isosceles Trapezoid given Lateral Edge and Acute Angle

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

[Open Calculator !\[\]\(0f848bbd71cef6b345273b16f905912a_img.jpg\)](#)

$$ex \quad 4.09576m = 5m \cdot \sin(55^\circ)$$

27) Height of Isosceles Trapezoid given Long and Short Base

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

[Open Calculator !\[\]\(3211b5d1d968fc1665909b34f9f16010_img.jpg\)](#)

$$ex \quad 4.284444m = \left(\frac{15m - 9m}{2} \right) \cdot \tan(55^\circ)$$

Perimeter of Isosceles Trapezoid

28) Perimeter of Isosceles Trapezoid

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

[Open Calculator !\[\]\(e3275251d0893157c3584e20c81dc3ba_img.jpg\)](#)

$$ex \quad 34m = 15m + 9m + (2 \cdot 5m)$$

29) Perimeter of Isosceles Trapezoid given Central Median

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

[Open Calculator !\[\]\(eabd9f9ababee93effadc3b380fe65fd_img.jpg\)](#)

$$ex \quad 34m = 2 \cdot (5m + 12m)$$






Variables Used

- \angle_{Acute} Acute Angle of Isosceles Trapezoid (Degree)
- **A** Area of Isosceles Trapezoid (Square Meter)
- **B_{Long}** Long Base of Isosceles Trapezoid (Meter)
- **B_{Short}** Short Base of Isosceles Trapezoid (Meter)
- **d** Diagonal of Isosceles Trapezoid (Meter)
- **h** Height of Isosceles Trapezoid (Meter)
- **l_{e(Lateral)}** Lateral Edge of Isosceles Trapezoid (Meter)
- **M** Central Median of Isosceles Trapezoid (Meter)
- **P** Perimeter of Isosceles Trapezoid (Meter)
- **r_c** Circumradius of Isosceles Trapezoid (Meter)



Constants, Functions, Measurements used











- **Function:** **cos**, $\cos(\text{Angle})$
Trigonometric cosine function
- **Function:** **cot**, $\cot(\text{Angle})$
Trigonometric cotangent function
- **Function:** **sin**, $\sin(\text{Angle})$
Trigonometric sine function
- **Function:** **sqrt**, $\text{sqrt}(\text{Number})$
Square root function
- **Function:** **tan**, $\tan(\text{Angle})$
Trigonometric tangent function
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion 
- **Measurement:** **Area** in Square Meter (m^2)
Area Unit Conversion 
- **Measurement:** **Angle** in Degree ($^\circ$)
Angle Unit Conversion 



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