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Important Formulas of Isosceles Triangle

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List of 14 Important Formulas of Isosceles Triangle

Important Formulas of Isosceles Triangle

Area of Isosceles Triangle

1) Area of Isosceles Triangle

$$\text{fx } A = \frac{S_{\text{Base}}}{2} \cdot \sqrt{S_{\text{Legs}}^2 - \frac{S_{\text{Base}}^2}{4}}$$

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

$$\text{ex } 25.45584\text{m}^2 = \frac{6\text{m}}{2} \cdot \sqrt{(9\text{m})^2 - \frac{(6\text{m})^2}{4}}$$

2) Area of Isosceles Triangle by Heron's Formula

$$\text{fx } A = (s - S_{\text{Legs}}) \cdot \sqrt{s \cdot (s - S_{\text{Base}})}$$

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

$$\text{ex } 25.45584\text{m}^2 = (12\text{m} - 9\text{m}) \cdot \sqrt{12\text{m} \cdot (12\text{m} - 6\text{m})}$$



Other Formulas of Isosceles Triangle

3) Angles of Bisector of Isosceles Triangle at Vertex

$$\text{fx } \angle_{\text{Bisector}} = \frac{\angle_{\text{Vertex}}}{2}$$

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

$$\text{ex } 20^\circ = \frac{40^\circ}{2}$$

4) Base Angles of Isosceles Triangle given Vertex Angle

$$\text{fx } \angle_{\text{Base}} = \frac{\pi - \angle_{\text{Vertex}}}{2}$$

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

$$\text{ex } 70^\circ = \frac{\pi - 40^\circ}{2}$$

5) Base of Isosceles Triangle given Legs and Circumradius

$$\text{fx } S_{\text{Base}} = \sqrt{4 \cdot S_{\text{Legs}}^2 - \frac{S_{\text{Legs}}^4}{r_c^2}}$$

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

$$\text{ex } 7.846018\text{m} = \sqrt{4 \cdot (9\text{m})^2 - \frac{(9\text{m})^4}{(5\text{m})^2}}$$



6) Height of Isosceles Triangle from Vertex

[Open Calculator !\[\]\(dfbd6b3763a6d1d9afaa974f64e2e4b5_img.jpg\)](#)

$$\text{fx } h = \sqrt{S_{\text{Legs}}^2 - \frac{S_{\text{Base}}^2}{4}}$$

$$\text{ex } 8.485281\text{m} = \sqrt{(9\text{m})^2 - \frac{(6\text{m})^2}{4}}$$

7) Length of Angle Bisector of Angle between Legs and Base

[Open Calculator !\[\]\(ec9132f1d27c8919987d92907322654d_img.jpg\)](#)

$$\text{fx } l_{\text{Angle Bisector}} = S_{\text{Base}} \cdot \frac{\sqrt{S_{\text{Legs}} \cdot (2 \cdot S_{\text{Legs}} + S_{\text{Base}})}}{S_{\text{Legs}} + S_{\text{Base}}}$$

$$\text{ex } 5.878775\text{m} = 6\text{m} \cdot \frac{\sqrt{9\text{m} \cdot (2 \cdot 9\text{m} + 6\text{m})}}{9\text{m} + 6\text{m}}$$

8) Median of Isosceles Triangle from Vertex

[Open Calculator !\[\]\(758ebdf4629c903da74c2e079717ae32_img.jpg\)](#)

$$\text{fx } M = \frac{\sqrt{4 \cdot S_{\text{Legs}}^2 - S_{\text{Base}}^2}}{2}$$

$$\text{ex } 8.485281\text{m} = \frac{\sqrt{4 \cdot (9\text{m})^2 - (6\text{m})^2}}{2}$$



Perimeter of Isosceles Triangle

9) Perimeter of Isosceles Triangle

$$fx \quad P = 2 \cdot S_{\text{Legs}} + S_{\text{Base}}$$

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

$$ex \quad 24m = 2 \cdot 9m + 6m$$

10) Semiperimeter of Isosceles Triangle

$$fx \quad s = \frac{2 \cdot S_{\text{Legs}} + S_{\text{Base}}}{2}$$

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

$$ex \quad 12m = \frac{2 \cdot 9m + 6m}{2}$$

Radius of Isosceles Triangle

11) Circumradius of Isosceles Triangle

$$fx \quad r_i = \frac{S_{\text{Legs}}^2}{\sqrt{4 \cdot S_{\text{Legs}}^2 - S_{\text{Base}}^2}}$$

[Open Calculator !\[\]\(799877f5c2f906134441300079881630_img.jpg\)](#)

$$ex \quad 4.772971m = \frac{(9m)^2}{\sqrt{4 \cdot (9m)^2 - (6m)^2}}$$



12) Inradius of Isosceles Triangle [Open Calculator !\[\]\(eafc244b53721dd1ec133f0772f70fc7_img.jpg\)](#)

$$\text{fx } r_i = \frac{S_{\text{Base}}}{2} \cdot \sqrt{\frac{2 \cdot S_{\text{Legs}} - S_{\text{Base}}}{2 \cdot S_{\text{Legs}} + S_{\text{Base}}}}$$

$$\text{ex } 2.12132\text{m} = \frac{6\text{m}}{2} \cdot \sqrt{\frac{2 \cdot 9\text{m} - 6\text{m}}{2 \cdot 9\text{m} + 6\text{m}}}$$

13) Inradius of Isosceles Triangle given Base and Height [Open Calculator !\[\]\(10f8862fc183b400327470ea85afe9ae_img.jpg\)](#)

$$\text{fx } r_i = \frac{S_{\text{Base}} \cdot h}{S_{\text{Base}} + \sqrt{4 \cdot h^2 + S_{\text{Base}}^2}}$$

$$\text{ex } 2.079001\text{m} = \frac{6\text{m} \cdot 8\text{m}}{6\text{m} + \sqrt{4 \cdot (8\text{m})^2 + (6\text{m})^2}}$$

14) Inradius of Isosceles Triangle given Legs and Base Angle [Open Calculator !\[\]\(35dc653d59570f8f891c312eeece91a2_img.jpg\)](#)

$$\text{fx } r_i = S_{\text{Legs}} \cdot \cos(\angle_{\text{Base}}) \cdot \tan\left(\frac{\angle_{\text{Base}}}{2}\right)$$

$$\text{ex } 2.155366\text{m} = 9\text{m} \cdot \cos(70^\circ) \cdot \tan\left(\frac{70^\circ}{2}\right)$$






Variables Used

- \angle_{Base} Base Angles of Isosceles Triangle (Degree)
- \angle_{Bisector} Angles of Bisector of Isosceles Triangle (Degree)
- \angle_{Vertex} Vertex Angle of Isosceles Triangle (Degree)
- **A** Area of Isosceles Triangle (Square Meter)
- **h** Height of Isosceles Triangle (Meter)
- **l_{Angle Bisector}** Length of Angle Bisector of Isosceles Triangle (Meter)
- **M** Median of Isosceles Triangle (Meter)
- **P** Perimeter of Isosceles Triangle (Meter)
- **r_c** Circumradius of Isosceles Triangle (Meter)
- **r_i** Inradius of Isosceles Triangle (Meter)
- **s** Semiperimeter of Isosceles Triangle (Meter)
- **S_{Base}** Base of Isosceles Triangle (Meter)
- **S_{Legs}** Legs of Isosceles Triangle (Meter)









Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288
Archimedes' constant
- **Function:** **cos**, $\cos(\text{Angle})$
Trigonometric cosine 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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- [Isosceles Right Triangle Formulas](#) 
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