

Important Formulas of Isosceles Triangle PDF



Formulas
Examples
with Units

List of 14 Important Formulas of Isosceles Triangle

1) Area of Isosceles Triangle Formulas

1.1) Area of Isosceles Triangle Formula

Formula

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

Example with Units

$$25.4558 \text{ m}^2 = \frac{6 \text{ m}}{2} \cdot \sqrt{9 \text{ m}^2 - \frac{6 \text{ m}^2}{4}}$$

Evaluate Formula 

1.2) Area of Isosceles Triangle by Heron's Formula Formula

Formula

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

Evaluate Formula 

Example with Units

$$25.4558 \text{ m}^2 = (12 \text{ m} - 9 \text{ m}) \cdot \sqrt{12 \text{ m} \cdot (12 \text{ m} - 6 \text{ m})}$$

2) Other Formulas of Isosceles Triangle Formulas

2.1) Angles of Bisector of Isosceles Triangle at Vertex Formula

Formula

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

Example with Units

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

Evaluate Formula 

2.2) Base Angles of Isosceles Triangle given Vertex Angle Formula

Formula

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

Example with Units

$$70^\circ = \frac{3.1416 - 40^\circ}{2}$$

Evaluate Formula 

2.3) Base of Isosceles Triangle given Legs and Circumradius Formula

Formula

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

Example with Units

$$7.846 \text{ m} = \sqrt{4 \cdot 9 \text{ m}^2 - \frac{9 \text{ m}^4}{5 \text{ m}^2}}$$

Evaluate Formula 



2.4) Height of Isosceles Triangle from Vertex Formula

Formula

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

Example with Units

$$8.4853 \text{ m} = \sqrt{9 \text{ m}^2 - \frac{6 \text{ m}^2}{4}}$$

Evaluate Formula 

2.5) Length of Angle Bisector of Angle between Legs and Base Formula

Formula

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

Evaluate Formula 

Example with Units

$$5.8788 \text{ m} = 6 \text{ m} \cdot \frac{\sqrt{9 \text{ m} \cdot (2 \cdot 9 \text{ m} + 6 \text{ m})}}{9 \text{ m} + 6 \text{ m}}$$

2.6) Median of Isosceles Triangle from Vertex Formula

Formula

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

Example with Units

$$8.4853 \text{ m} = \frac{\sqrt{4 \cdot 9 \text{ m}^2 - 6 \text{ m}^2}}{2}$$

Evaluate Formula 

3) Perimeter of Isosceles Triangle Formulas

3.1) Perimeter of Isosceles Triangle Formula

Formula

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

Example with Units

$$24 \text{ m} = 2 \cdot 9 \text{ m} + 6 \text{ m}$$

Evaluate Formula 

3.2) Semiperimeter of Isosceles Triangle Formula

Formula

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

Example with Units

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

Evaluate Formula 

4) Radius of Isosceles Triangle Formulas

4.1) Circumradius of Isosceles Triangle Formula

Formula

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

Example with Units

$$4.773 \text{ m} = \frac{9 \text{ m}^2}{\sqrt{4 \cdot 9 \text{ m}^2 - 6 \text{ m}^2}}$$

Evaluate Formula 



4.2) Inradius of Isosceles Triangle Formula

Formula

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

Example with Units

$$2.1213 \text{ m} = \frac{6 \text{ m}}{2} \cdot \sqrt{\frac{2 \cdot 9 \text{ m} - 6 \text{ m}}{2 \cdot 9 \text{ m} + 6 \text{ m}}}$$

Evaluate Formula 

4.3) Inradius of Isosceles Triangle given Base and Height Formula

Formula

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

Example with Units

$$2.079 \text{ m} = \frac{6 \text{ m} \cdot 8 \text{ m}}{6 \text{ m} + \sqrt{4 \cdot 8 \text{ m}^2 + 6 \text{ m}^2}}$$

Evaluate Formula 

4.4) Inradius of Isosceles Triangle given Legs and Base Angle Formula

Formula

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

Example with Units

$$2.1554 \text{ m} = 9 \text{ m} \cdot \cos(70^\circ) \cdot \tan\left(\frac{70^\circ}{2}\right)$$

Evaluate Formula 



Variables used in list of Important Formulas of Isosceles Triangle above

- $\angle$ **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 in list of Important Formulas of Isosceles Triangle above

- **constant(s)**: pi, 3.14159265358979323846264338327950288
Archimedes' constant
- **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**: **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.
- **Functions**: **tan**, tan(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 (m²)
Area Unit Conversion 
- **Measurement**: **Angle** in Degree (°)
Angle Unit Conversion 



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