Important Formulas of Octagon PDF

Formulas
Examples
with Units

List of 31
Important Formulas of Octagon

1) Area of Octagon Formulas

1.1) Area of Octagon Formula

Evaluate Formula

Formula

$$A = 2 \cdot \left(1 + \sqrt{2}\right) \cdot l_e^2$$

Example with Units

$$482.8427\,\text{m}^2 = 2 \cdot \left(1 + \sqrt{2}\right) \cdot 10\,\text{m}^2$$

1.2) Area of Octagon given Circumradius Formula

Evaluate Formula

Formula

$$A = 2 \cdot \sqrt{2} \cdot r_c^2$$

Example with Units

$$478.0042\,\text{m}^2 = 2 \cdot \sqrt{2} \cdot 13\,\text{m}^2$$

1.3) Area of Octagon given Edge Length and Inradius Formula

Evaluate Formula

Formula

$$A = 4 \cdot l_e \cdot r_i$$

Example with Units

$$480\,\text{m}^2 = 4 \cdot 10\,\text{m} \cdot 12\,\text{m}$$

1.4) Area of Octagon given Height Formula

Evaluate Formula

Formula

$$A = 2 \cdot \left(\sqrt{2} - 1\right) \cdot h^2$$

Example with Units

$$477.174\,\text{m}^2 = 2 \cdot \left(\sqrt{2} - 1\right) \cdot 24\,\text{m}^2$$

1.5) Area of Octagon given Perimeter Formula

Evaluate Formula

Formula

$$A = \left(1 + \sqrt{2}\right) \cdot \frac{P^2}{32}$$

Example with Units

$$482.8427\,\text{m}^2 = \left(1 + \sqrt{2}\right) \cdot \frac{80\,\text{m}^2}{32}$$

2) Diagonal of Octagon Formulas

2.1) Long Diagonal of Octagon Formula

Evaluate Formula

Formula

$$d_{Long} = \sqrt{4 + \left(2 \cdot \sqrt{2}\right)} \cdot l_e$$

Example with Units

$$26.1313\,\text{m} = \sqrt{4 + \left(2 \cdot \sqrt{2}\right)} \cdot 10\,\text{m}$$

2.2) Long Diagonal of Octagon given Circumradius Formula

Evaluate Formula

Formula

$$d_{Long} = 2 \cdot r_c$$

Example with Units

$$26\,\text{m} = 2 \cdot 13\,\text{m}$$

2.3) Medium Diagonal of Octagon Formula

Evaluate Formula

Formula

$$d_{Medium} = \left(1 + \sqrt{2}\right) \cdot l_e$$

Example with Units

$$24.1421\,\text{m} = \left(1 + \sqrt{2}\right) \cdot 10\,\text{m}$$

2.4) Medium Diagonal of Octagon given Inradius Formula

Evaluate Formula

Formula

$$d_{Medium} = 2 \cdot r_i$$

Example with Units

$$24\,\text{m} = 2 \cdot 12\,\text{m}$$

2.5) Short Diagonal of Octagon Formula

Evaluate Formula

Formula

$$d_{Short} = \sqrt{2 + \sqrt{2}} \cdot l_e$$

Example with Units

$$18.4776\,\text{m} = \sqrt{2 + \sqrt{2}} \cdot 10\,\text{m}$$

2.6) Short Diagonal of Octagon given Area Formula

Evaluate Formula

Formula

$$d_{Short} = \sqrt{\frac{A}{\sqrt{2}}}$$

Example with Units

$$18.4231\,\text{m} = \sqrt{\frac{480\,\text{m}^2}{\sqrt{2}}}$$

3) Edge Length of Octagon Formulas

3.1) Edge Length of Octagon given Area Formula

Evaluate Formula

Formula

$$l_e = \sqrt{\left(\sqrt{2} - 1\right) \cdot \left(\frac{A}{2}\right)}$$

Example with Units

$$9.9705\,\text{m} = \sqrt{\left(\sqrt{2} - 1\right) \cdot \left(\frac{480\,\text{m}^2}{2}\right)}$$

3.2) Edge Length of Octagon given Circumradius Formula

Evaluate Formula

Formula

$$l_e = \left(\sqrt{2 - \sqrt{2}}\right) \cdot r_c$$

Example with Units

$$9.9498\,\text{m} = \left(\sqrt{2 - \sqrt{2}}\right) \cdot 13\,\text{m}$$

3.3) Edge Length of Octagon given Height Formula

Evaluate Formula

Formula

$$l_e = \left(\sqrt{2} - 1\right) \cdot h$$

Example with Units

$$9.9411\,\text{m} = \left(\sqrt{2} - 1\right) \cdot 24\,\text{m}$$

3.4) Edge Length of Octagon given Long Diagonal Formula

Evaluate Formula

Formula

$$l_e = \left(\frac{\sqrt{2 - \sqrt{2}}}{2}\right) \cdot d_{Long}$$

Example with Units

$$9.9498\,\text{m} = \left(\frac{\sqrt{2 - \sqrt{2}}}{2}\right) \cdot 26\,\text{m}$$

4) Height of Octagon Formulas

4.1) Height of Octagon Formula

Evaluate Formula

Formula

$$h = \left(1 + \sqrt{2}\right) \cdot l_e$$

Example with Units

$$24.1421\,\text{m} = \left(1 + \sqrt{2}\right) \cdot 10\,\text{m}$$

4.2) Height of Octagon given Area Formula

Evaluate Formula

Formula

$$h = \sqrt{\left(\frac{1 + \sqrt{2}}{2}\right) \cdot A}$$

Example with Units

$$24.071\,\text{m} = \sqrt{\left(\frac{1 + \sqrt{2}}{2}\right) \cdot 480\,\text{m}^2}$$

4.3) Height of Octagon given Medium Diagonal Formula

Evaluate Formula

Formula

$$h = d_{Medium} \cdot 1$$

Example with Units

$$24\,\text{m} = 24\,\text{m} \cdot 1$$

4.4) Height of Octagon given Perimeter Formula

Evaluate Formula

Formula

$$h = \left(1 + \sqrt{2}\right) \cdot \frac{P}{8}$$

Example with Units

$$24.1421\,\text{m} = \left(1 + \sqrt{2}\right) \cdot \frac{80\,\text{m}}{8}$$

5) Perimeter of Octagon Formulas

5.1) Perimeter of Octagon Formula

Evaluate Formula

Formula

$$P = 8 \cdot l_e$$

Example with Units

$$80\,\text{m} = 8 \cdot 10\,\text{m}$$

5.2) Perimeter of Octagon given Circumradius Formula

Evaluate Formula

Formula

$$P = \frac{16 \cdot r_c}{\sqrt{4 + \left(2 \cdot \sqrt{2}\right)}}$$

Example with Units

$$79.5982\,\text{m} = \frac{16 \cdot 13\,\text{m}}{\sqrt{4 + \left(2 \cdot \sqrt{2}\right)}}$$

5.3) Perimeter of Octagon given Inradius Formula

Evaluate Formula

Formula

$$P = \frac{16 \cdot r_i}{1 + \sqrt{2}}$$

Example with Units

$$79.529\,\text{m} = \frac{16 \cdot 12\,\text{m}}{1 + \sqrt{2}}$$

6) Radius of Octagon Formulas

6.1) Circumradius of Octagon Formula

Evaluate Formula

Formula

$$r_c = \sqrt{1 + \left(\frac{1}{\sqrt{2}}\right)} \cdot l_e$$

Example with Units

$$13.0656\,\text{m} = \sqrt{1 + \left(\frac{1}{\sqrt{2}}\right)} \cdot 10\,\text{m}$$

6.2) Circumradius of Octagon given Height Formula

Evaluate Formula

Formula

$$r_c = \sqrt{1 - \left(\frac{1}{\sqrt{2}}\right)} \cdot h$$

Example with Units

$$12.9887\,\text{m} = \sqrt{1 - \left(\frac{1}{\sqrt{2}}\right)} \cdot 24\,\text{m}$$

6.3) Inradius of Octagon Formula

Evaluate Formula

Formula

$$r_i = \left(\frac{1 + \sqrt{2}}{2}\right) \cdot l_e$$

Example with Units

$$12.0711\,\text{m} = \left(\frac{1 + \sqrt{2}}{2}\right) \cdot 10\,\text{m}$$

6.4) Inradius of Octagon given Height Formula

Evaluate Formula

Formula

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

Example with Units

$$12\,\text{m} = \frac{24\,\text{m}}{2}$$

6.5) Inradius of Octagon given Width Formula

Evaluate Formula

Formula

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

Example with Units

$$12\,\text{m} = \frac{24\,\text{m}}{2}$$

7) Width of Octagon Formulas

7.1) Width of Octagon Formula

Evaluate Formula

Formula

$$w = \left(\sqrt{2} + 1\right) \cdot l_e$$

Example with Units

$$24.1421\,\text{m} = \left(\sqrt{2} + 1\right) \cdot 10\,\text{m}$$

7.2) Width of Octagon given Circumradius Formula

Evaluate Formula

Formula

$$w = \left(\sqrt{2} + 1\right) \cdot \left(\sqrt{2 - \sqrt{2}}\right) \cdot r_c$$

Example with Units

$$24.0209\,\text{m} = \left(\sqrt{2} + 1\right) \cdot \left(\sqrt{2 - \sqrt{2}}\right) \cdot 13\,\text{m}$$

7.3) Width of Octagon given Medium Diagonal Formula

Evaluate Formula

Formula

$$w = 1 \cdot d_{Medium}$$

Example with Units

$$24\,\text{m} = 1 \cdot 24\,\text{m}$$

7.4) Width of Octagon given Perimeter Formula

Evaluate Formula

Formula

$$w = \left(\sqrt{2} + 1\right) \cdot \frac{P}{8}$$

Example with Units

$$24.1421\,\text{m} = \left(\sqrt{2} + 1\right) \cdot \frac{80\,\text{m}}{8}$$

Variables used in list of Important Formulas of Octagon above

- **A** Area of Octagon *(Square Meter)*
- d_{Long} Long Diagonal of Octagon *(Meter)*
- d_{Medium} Medium Diagonal of Octagon *(Meter)*
- d_{Short} Short Diagonal of Octagon *(Meter)*
- **h** Height of Octagon *(Meter)*
- l_e Edge Length of Octagon *(Meter)*
- **P** Perimeter of Octagon *(Meter)*
- r_c Circumradius of Octagon *(Meter)*
- r_i Inradius of Octagon *(Meter)*
- **w** Width of Octagon *(Meter)*

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

- 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

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