

Important N-gon Formulas PDF



Formulas Examples with Units

List of 13 Important N-gon Formulas

1) Number of M sided Polygons formed by joining Vertices of N-gon Formula ↻

Formula

$$N_{\text{Polygons}} = C(N_{\text{Sides}}, M_{\text{Sides}})$$

Example

$$28 = C(8, 6)$$

Evaluate Formula ↻

2) Angles of N-gon Formulas ↻

2.1) Central Angle of N-gon Formula ↻

Formula

$$\angle_{\text{Central}} = \frac{2 \cdot \pi}{N_{\text{Sides}}}$$

Example with Units

$$45^\circ = \frac{2 \cdot 3.1416}{8}$$

Evaluate Formula ↻

2.2) Exterior Angle of N-gon Formula ↻

Formula

$$\angle_{\text{Exterior}} = \frac{2 \cdot \pi}{N_{\text{Sides}}}$$

Example with Units

$$45^\circ = \frac{2 \cdot 3.1416}{8}$$

Evaluate Formula ↻

2.3) Sum of Exterior Angles of N-gon Formula ↻

Formula

$$\text{Sum}_{\text{Exterior Angles}} = 2 \cdot \pi \cdot \left(\frac{N_{\text{Sides}}}{N_{\text{Sides}}} \right)$$

Example with Units

$$360^\circ = 2 \cdot 3.1416 \cdot \left(\frac{8}{8} \right)$$

Evaluate Formula ↻

2.4) Sum of Interior Angles of N-gon Formula ↻

Formula

$$\text{Sum}_{\text{Interior Angles}} = (N_{\text{Sides}} - 2) \cdot \pi$$

Example with Units

$$1080^\circ = (8 - 2) \cdot 3.1416$$

Evaluate Formula ↻



3) Area and Perimeter of N-gon Formulas

3.1) Area of N-gon Formula

Formula

$$A = \frac{N_{\text{Sides}} \cdot l_e^2}{4 \cdot \tan\left(\frac{\pi}{N_{\text{Sides}}}\right)}$$

Example with Units

$$482.8427 \text{ m}^2 = \frac{8 \cdot 10 \text{ m}^2}{4 \cdot \tan\left(\frac{3.1416}{8}\right)}$$

Evaluate Formula

3.2) Perimeter of N-gon Formula

Formula

$$P = l_e \cdot N_{\text{Sides}}$$

Example with Units

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

Evaluate Formula

4) Diagonals of N-gon Formulas

4.1) Diagonal across M sides of N-gon Formula

Formula

$$d_m = \frac{l_e \cdot \sin\left(\pi \cdot \frac{M_{\text{Sides}}}{N_{\text{Sides}}}\right)}{\sin\left(\frac{\pi}{N_{\text{Sides}}}\right)}$$

Example with Units

$$18.4776 \text{ m} = \frac{10 \text{ m} \cdot \sin\left(3.1416 \cdot \frac{6}{8}\right)}{\sin\left(\frac{3.1416}{8}\right)}$$

Evaluate Formula

4.2) Number of Diagonals of N-gon Formula

Formula

$$N_{\text{Diagonals}} = \frac{N_{\text{Sides}} \cdot (N_{\text{Sides}} - 3)}{2}$$

Example

$$20 = \frac{8 \cdot (8 - 3)}{2}$$

Evaluate Formula

5) Height of N-gon Formulas

5.1) Height of N-gon when N is Even Formula

Formula

$$h = 2 \cdot r_i$$

Example with Units

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

Evaluate Formula

5.2) Height of N-gon when N is Odd Formula

Formula

$$h = \frac{l_e}{2 \cdot \tan\left(\frac{\pi}{2} / N_{\text{Sides}}\right)}$$

Example with Units

$$25.1367 \text{ m} = \frac{10 \text{ m}}{2 \cdot \tan\left(\frac{3.1416}{2} / 8\right)}$$

Evaluate Formula



6) Radius of N-gon Formulas

6.1) Circumradius of N-gon Formula

Formula

$$r_c = \frac{l_e}{2 \cdot \sin\left(\frac{\pi}{N_{\text{Sides}}}\right)}$$

Example with Units

$$13.0656 \text{ m} = \frac{10 \text{ m}}{2 \cdot \sin\left(\frac{3.1416}{8}\right)}$$

Evaluate Formula 

6.2) Inradius of N-gon Formula

Formula

$$r_i = \frac{l_e}{2 \cdot \tan\left(\frac{\pi}{N_{\text{Sides}}}\right)}$$

Example with Units

$$12.0711 \text{ m} = \frac{10 \text{ m}}{2 \cdot \tan\left(\frac{3.1416}{8}\right)}$$




Evaluate Formula 



Variables used in list of N-gon Formulas above

- \angle **Central** Central Angle of N-gon (Degree)
- \angle **Exterior** Exterior Angle of N-gon (Degree)
- **A** Area of N-gon (Square Meter)
- **d_m** Diagonal across M Sides of N-gon (Meter)
- **h** Height of N-gon (Meter)
- **l_e** Edge Length of N-gon (Meter)
- **M_{Sides}** M Number of Sides of N-gon
- **N_{Diagonals}** Number of Diagonals of N-gon
- **N_{Polygons}** Number of Polygons of N-gon
- **N_{Sides}** Number of Sides of N-gon
- **P** Perimeter of N-gon (Meter)
- **r_c** Circumradius of N-gon (Meter)
- **r_i** Inradius of N-gon (Meter)
- **Sum_{Exterior Angles}** Sum of Exterior Angles of N-gon (Degree)
- **Sum_{Interior Angles}** Sum of Interior Angles of N-gon (Degree)

Constants, Functions, Measurements used in list of N-gon Formulas above

- **constant(s):** π ,
3.14159265358979323846264338327950288
Archimedes' constant
- **Functions: C**, $C(n,k)$
In combinatorics, the binomial coefficient is a way to represent the number of ways to choose a subset of objects from a larger set. It is also known as the "n choose k" tool.
- **Functions: sin**, $\sin(\text{Angle})$
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: tan**, $\tan(\text{Angle})$
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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