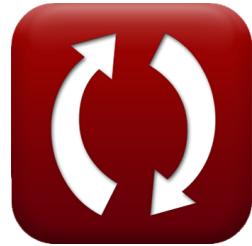




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# Important Formulas of Nonagon

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# List of 21 Important Formulas of Nonagon

## Important Formulas of Nonagon ↗

### Area of Nonagon ↗

#### 1) Area of Nonagon ↗

**fx** 
$$A = \frac{9}{4} \cdot S^2 \cdot \cot\left(\frac{\pi}{9}\right)$$

[Open Calculator ↗](#)

**ex** 
$$395.6367m^2 = \frac{9}{4} \cdot (8m)^2 \cdot \cot\left(\frac{\pi}{9}\right)$$

#### 2) Area of Nonagon given Height ↗

**fx** 
$$A = \frac{\left(\frac{3 \cdot \sin\left(\frac{\pi}{9}\right) \cdot h}{1 + \cos\left(\frac{\pi}{9}\right)}\right)^2}{\tan\left(\frac{\pi}{9}\right)}$$

[Open Calculator ↗](#)

**ex** 
$$372.0999m^2 = \frac{\left(\frac{3 \cdot \sin\left(\frac{\pi}{9}\right) \cdot 22m}{1 + \cos\left(\frac{\pi}{9}\right)}\right)^2}{\tan\left(\frac{\pi}{9}\right)}$$



### 3) Area of Nonagon given Inradius ↗

$$fx \quad A = 9 \cdot r_i^2 \cdot \tan\left(\frac{\pi}{9}\right)$$

[Open Calculator ↗](#)

$$ex \quad 396.3636m^2 = 9 \cdot (11m)^2 \cdot \tan\left(\frac{\pi}{9}\right)$$

### 4) Area of Nonagon given Perimeter ↗

$$fx \quad A = \frac{P^2 \cdot \cot\left(\frac{\pi}{9}\right)}{36}$$

[Open Calculator ↗](#)

$$ex \quad 373.9622m^2 = \frac{(70m)^2 \cdot \cot\left(\frac{\pi}{9}\right)}{36}$$

### Diagonal of Nonagon ↗

#### 5) Diagonal of Nonagon across Four Sides ↗

$$fx \quad d_4 = S \cdot \left( \frac{\sin\left(4 \cdot \frac{\pi}{9}\right)}{\sin\left(\frac{\pi}{9}\right)} \right)$$

[Open Calculator ↗](#)

$$ex \quad 23.03508m = 8m \cdot \left( \frac{\sin\left(4 \cdot \frac{\pi}{9}\right)}{\sin\left(\frac{\pi}{9}\right)} \right)$$



**6) Diagonal of Nonagon across Three Sides ↗**

**fx**  $d_3 = S \cdot \left( \frac{\sin\left(3 \cdot \frac{\pi}{9}\right)}{\sin\left(\frac{\pi}{9}\right)} \right)$

**Open Calculator ↗**

**ex**  $20.25671m = 8m \cdot \left( \frac{\sin\left(3 \cdot \frac{\pi}{9}\right)}{\sin\left(\frac{\pi}{9}\right)} \right)$

**7) Diagonal of Nonagon across Two Sides ↗**

**fx**  $d_2 = S \cdot \left( \frac{\sin\left(2 \cdot \frac{\pi}{9}\right)}{\sin\left(\frac{\pi}{9}\right)} \right)$

**Open Calculator ↗**

**ex**  $15.03508m = 8m \cdot \left( \frac{\sin\left(2 \cdot \frac{\pi}{9}\right)}{\sin\left(\frac{\pi}{9}\right)} \right)$

**Height of Nonagon ↗****8) Height of Nonagon ↗**

**fx**  $h = r_c + r_i$

**Open Calculator ↗**

**ex**  $23m = 12m + 11m$



**9) Height of Nonagon given Area** ↗

**fx** 
$$h = \left( \frac{1 + \cos\left(\frac{\pi}{9}\right)}{3 \cdot \sin\left(\frac{\pi}{9}\right)} \right) \cdot \sqrt{A \cdot \left( \tan\left(\frac{\pi}{9}\right) \right)}$$

**Open Calculator** ↗

**ex** 
$$22.66686m = \left( \frac{1 + \cos\left(\frac{\pi}{9}\right)}{3 \cdot \sin\left(\frac{\pi}{9}\right)} \right) \cdot \sqrt{395m^2 \cdot \left( \tan\left(\frac{\pi}{9}\right) \right)}$$

**10) Height of Nonagon given Side** ↗

**fx** 
$$h = \left( \frac{1 + \cos\left(\frac{\pi}{9}\right)}{2 \cdot \sin\left(\frac{\pi}{9}\right)} \right) \cdot S$$

**Open Calculator** ↗

**ex** 
$$22.68513m = \left( \frac{1 + \cos\left(\frac{\pi}{9}\right)}{2 \cdot \sin\left(\frac{\pi}{9}\right)} \right) \cdot 8m$$

**Perimeter of Nonagon** ↗**11) Perimeter of Nonagon** ↗

**fx** 
$$P = 9 \cdot S$$

**Open Calculator** ↗

**ex** 
$$72m = 9 \cdot 8m$$



**12) Perimeter of Nonagon given Area** ↗

fx

$$P = 9 \cdot \sqrt{\frac{4 \cdot A}{9 \cdot \cot\left(\frac{\pi}{9}\right)}}$$

Open Calculator ↗

ex

$$71.94204m = 9 \cdot \sqrt{\frac{4 \cdot 395m^2}{9 \cdot \cot\left(\frac{\pi}{9}\right)}}$$

**13) Perimeter of Nonagon given Inradius** ↗

fx

$$P = 18 \cdot r_i \cdot \tan\left(\frac{\pi}{9}\right)$$

Open Calculator ↗

ex

$$72.06611m = 18 \cdot 11m \cdot \tan\left(\frac{\pi}{9}\right)$$

**Radius of Nonagon** ↗**14) Circumradius of Nonagon** ↗

fx

$$r_c = \frac{s}{2 \cdot \sin\left(\frac{\pi}{9}\right)}$$

Open Calculator ↗

ex

$$11.69522m = \frac{8m}{2 \cdot \sin\left(\frac{\pi}{9}\right)}$$



**15) Circumradius of Nonagon given Height** ↗

$$fx \quad r_c = \frac{h}{1 + \cos\left(\frac{\pi}{9}\right)}$$

**Open Calculator ↗**

$$ex \quad 11.342m = \frac{22m}{1 + \cos\left(\frac{\pi}{9}\right)}$$

**16) Inradius of Nonagon** ↗

$$fx \quad r_i = \frac{s}{2 \cdot \tan\left(\frac{\pi}{9}\right)}$$

**Open Calculator ↗**

$$ex \quad 10.98991m = \frac{8m}{2 \cdot \tan\left(\frac{\pi}{9}\right)}$$

**17) Inradius of Nonagon given Diagonal across Two Sides** ↗

$$fx \quad r_i = \frac{\left( \frac{d_2}{2 \cdot (\sin(2 \cdot \frac{\pi}{9}))} \right) \cdot \sin\left(\frac{\pi}{9}\right)}{\tan\left(\frac{\pi}{9}\right)}$$

**Open Calculator ↗**

$$ex \quad 10.96427m = \frac{\left( \frac{15m}{2 \cdot (\sin(2 \cdot \frac{\pi}{9}))} \right) \cdot \sin\left(\frac{\pi}{9}\right)}{\tan\left(\frac{\pi}{9}\right)}$$



**18) Inradius of Nonagon given Height ↗**

$$fx \quad r_i = \frac{h}{1 + \sec\left(\frac{\pi}{9}\right)}$$

**Open Calculator ↗**

$$ex \quad 10.658m = \frac{22m}{1 + \sec\left(\frac{\pi}{9}\right)}$$

**Side of Nonagon ↗****19) Side of Nonagon given Area ↗**

$$fx \quad S = \sqrt{\frac{4}{9} \cdot \left( \frac{A}{\cot\left(\frac{\pi}{9}\right)} \right)}$$

**Open Calculator ↗**

$$ex \quad 7.99356m = \sqrt{\frac{4}{9} \cdot \left( \frac{395m^2}{\cot\left(\frac{\pi}{9}\right)} \right)}$$

**20) Side of Nonagon given Circumradius ↗**

$$fx \quad S = 2 \cdot r_c \cdot \sin\left(\frac{\pi}{9}\right)$$

**Open Calculator ↗**

$$ex \quad 8.208483m = 2 \cdot 12m \cdot \sin\left(\frac{\pi}{9}\right)$$



**21) Side of Nonagon given Height ↗****fx**

$$S = \left( \frac{2 \cdot \sin\left(\frac{\pi}{9}\right)}{1 + \cos\left(\frac{\pi}{9}\right)} \right) \cdot h$$

**Open Calculator ↗****ex**

$$7.758387m = \left( \frac{2 \cdot \sin\left(\frac{\pi}{9}\right)}{1 + \cos\left(\frac{\pi}{9}\right)} \right) \cdot 22m$$



## Variables Used

- **A** Area of Nonagon (*Square Meter*)
- **d<sub>2</sub>** Diagonal across Two Sides of Nonagon (*Meter*)
- **d<sub>3</sub>** Diagonal across Three Sides of Nonagon (*Meter*)
- **d<sub>4</sub>** Diagonal across Four Sides of Nonagon (*Meter*)
- **h** Height of Nonagon (*Meter*)
- **P** Perimeter of Nonagon (*Meter*)
- **r<sub>c</sub>** Circumradius of Nonagon (*Meter*)
- **r<sub>i</sub>** Inradius of Nonagon (*Meter*)
- **S** Side of Nonagon (*Meter*)



# Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288  
*Archimedes' constant*
- **Constant:** **e**, 2.71828182845904523536028747135266249  
*Napier's constant*
- **Function:** **cos**, cos(Angle)  
*Trigonometric cosine function*
- **Function:** **cot**, cot(Angle)  
*Trigonometric cotangent function*
- **Function:** **sec**, sec(Angle)  
*Trigonometric secant function*
- **Function:** **sin**, sin(Angle)  
*Trigonometric sine function*
- **Function:** **sqrt**, sqrt(Number)  
*Square root function*
- **Function:** **tan**, tan(Angle)  
*Trigonometric tangent function*
- **Measurement:** **Length** in Meter (m)  
*Length Unit Conversion* 
- **Measurement:** **Area** in Square Meter (m<sup>2</sup>)  
*Area Unit Conversion* 



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