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Important Formulas of Dodecagon

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List of 32 Important Formulas of Dodecagon

Important Formulas of Dodecagon

Area of Dodecagon

1) Area of Dodecagon

$$\text{fx } A = 3 \cdot (2 + \sqrt{3}) \cdot S^2$$

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

$$\text{ex } 1119.615\text{m}^2 = 3 \cdot (2 + \sqrt{3}) \cdot (10\text{m})^2$$

2) Area of Dodecagon given Circumradius

$$\text{fx } A = 3 \cdot r_c^2$$

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

$$\text{ex } 1200\text{m}^2 = 3 \cdot (20\text{m})^2$$

3) Area of Dodecagon given Height

$$\text{fx } A = \frac{3 \cdot h^2}{2 + \sqrt{3}}$$

[Open Calculator !\[\]\(f1c5da15572e3e09d343161be98f508d_img.jpg\)](#)

$$\text{ex } 1100.467\text{m}^2 = \frac{3 \cdot (37\text{m})^2}{2 + \sqrt{3}}$$



4) Area of Dodecagon given Width

[Open Calculator !\[\]\(4729e517bc6a7cd81c8025b9646574fb_img.jpg\)](#)

$$fx \quad A = 3 \cdot \frac{w^2}{2 + \sqrt{3}}$$

$$ex \quad 1100.467m^2 = 3 \cdot \frac{(37m)^2}{2 + \sqrt{3}}$$

Diagonal of Dodecagon

5) Diagonal of Dodecagon across Five Sides

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$fx \quad d_5 = (2 + \sqrt{3}) \cdot S$$

$$ex \quad 37.32051m = (2 + \sqrt{3}) \cdot 10m$$

6) Diagonal of Dodecagon across Five Sides given Height

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

$$fx \quad d_5 = \frac{h}{1}$$

$$ex \quad 37m = \frac{37m}{1}$$



7) Diagonal of Dodecagon across Five Sides given Width 

$$fx \quad d_5 = \frac{W}{1}$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

$$ex \quad 37m = \frac{37m}{1}$$

8) Diagonal of Dodecagon across Four Sides 

$$fx \quad d_4 = \frac{(3 \cdot \sqrt{2}) + \sqrt{6}}{2} \cdot S$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

$$ex \quad 33.46065m = \frac{(3 \cdot \sqrt{2}) + \sqrt{6}}{2} \cdot 10m$$

9) Diagonal of Dodecagon across Six Sides 

$$fx \quad d_6 = (\sqrt{6} + \sqrt{2}) \cdot S$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

$$ex \quad 38.63703m = (\sqrt{6} + \sqrt{2}) \cdot 10m$$

10) Diagonal of Dodecagon across Three Sides 

$$fx \quad d_3 = (\sqrt{3} + 1) \cdot S$$

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b_img.jpg\)](#)

$$ex \quad 27.32051m = (\sqrt{3} + 1) \cdot 10m$$



11) Diagonal of Dodecagon across Two Sides

$$\text{fx } d_2 = \frac{\sqrt{2} + \sqrt{6}}{2} \cdot S$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)

$$\text{ex } 19.31852\text{m} = \frac{\sqrt{2} + \sqrt{6}}{2} \cdot 10\text{m}$$

Height of Dodecagon

12) Height of Dodecagon

$$\text{fx } h = (2 + \sqrt{3}) \cdot S$$

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

$$\text{ex } 37.32051\text{m} = (2 + \sqrt{3}) \cdot 10\text{m}$$

13) Height of Dodecagon given Area

$$\text{fx } h = \sqrt{\frac{(2 + \sqrt{3}) \cdot A}{3}}$$

[Open Calculator !\[\]\(0fb13ad0bfa3d86868cdd3883e5665b3_img.jpg\)](#)

$$\text{ex } 37.32692\text{m} = \sqrt{\frac{(2 + \sqrt{3}) \cdot 1120\text{m}^2}{3}}$$



14) Height of Dodecagon given Inradius 

$$fx \quad h = 2 \cdot r_i$$

[Open Calculator !\[\]\(d3fb9f94af8b26d1c844efa9a98805b0_img.jpg\)](#)

$$ex \quad 38m = 2 \cdot 19m$$

Perimeter of Dodecagon 15) Perimeter of Dodecagon 

$$fx \quad P = 12 \cdot S$$

[Open Calculator !\[\]\(73002692dd5e7a64e60946be3158e719_img.jpg\)](#)

$$ex \quad 120m = 12 \cdot 10m$$

16) Perimeter of Dodecagon given Area 

$$fx \quad P = 12 \cdot \sqrt{\frac{A}{3 \cdot (2 + \sqrt{3})}}$$

[Open Calculator !\[\]\(104fbf564e2e5a8fbd84f31656d114c7_img.jpg\)](#)

$$ex \quad 120.0206m = 12 \cdot \sqrt{\frac{1120m^2}{3 \cdot (2 + \sqrt{3})}}$$

17) Perimeter of Dodecagon given Inradius 

$$fx \quad P = 12 \cdot \frac{r_i}{\frac{2 + \sqrt{3}}{2}}$$

[Open Calculator !\[\]\(21226b58c700e5231ab98d27101bac58_img.jpg\)](#)

$$ex \quad 122.1848m = 12 \cdot \frac{19m}{\frac{2 + \sqrt{3}}{2}}$$



Radius of Dodecagon

18) Circumradius of Dodecagon

$$\text{fx } r_c = \frac{\sqrt{6} + \sqrt{2}}{2} \cdot S$$

[Open Calculator !\[\]\(83f22ed94ec5517769dd76d702c6bfd8_img.jpg\)](#)

$$\text{ex } 19.31852\text{m} = \frac{\sqrt{6} + \sqrt{2}}{2} \cdot 10\text{m}$$

19) Circumradius of Dodecagon given Diagonal across Two Sides

$$\text{fx } r_c = \frac{d_2}{1}$$

[Open Calculator !\[\]\(3cb60d42b10e53f9522bb0b392c1c4cd_img.jpg\)](#)

$$\text{ex } 20\text{m} = \frac{20\text{m}}{1}$$

20) Circumradius of Dodecagon given Perimeter

$$\text{fx } r_c = \frac{\sqrt{6} + \sqrt{2}}{24} \cdot P$$

[Open Calculator !\[\]\(0d7ca0919e6c47bbd874bfa0189fe22e_img.jpg\)](#)

$$\text{ex } 19.31852\text{m} = \frac{\sqrt{6} + \sqrt{2}}{24} \cdot 120\text{m}$$



21) Circumradius of Dodecagon given Width 

$$\text{fx } r_c = \frac{\sqrt{6} + \sqrt{2}}{2} \cdot \frac{w}{2 + \sqrt{3}}$$

Open Calculator 

$$\text{ex } 19.15261\text{m} = \frac{\sqrt{6} + \sqrt{2}}{2} \cdot \frac{37\text{m}}{2 + \sqrt{3}}$$

22) Inradius of Dodecagon 

$$\text{fx } r_i = \frac{2 + \sqrt{3}}{2} \cdot S$$

Open Calculator 

$$\text{ex } 18.66025\text{m} = \frac{2 + \sqrt{3}}{2} \cdot 10\text{m}$$

23) Inradius of Dodecagon given Height 

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

Open Calculator 

$$\text{ex } 18.5\text{m} = \frac{37\text{m}}{2}$$

24) Inradius of Dodecagon given Perimeter 

$$\text{fx } r_i = \frac{2 + \sqrt{3}}{24} \cdot P$$

Open Calculator 

$$\text{ex } 18.66025\text{m} = \frac{2 + \sqrt{3}}{24} \cdot 120\text{m}$$



25) Inradius of Dodecagon given Width 

$$fx \quad r_i = \frac{W}{2}$$

[Open Calculator !\[\]\(71ceb62b681518c82e95d615e7265d66_img.jpg\)](#)

$$ex \quad 18.5m = \frac{37m}{2}$$

Side of Dodecagon 26) Side of Dodecagon given Area 

$$fx \quad S = \sqrt{\frac{A}{3 \cdot (2 + \sqrt{3})}}$$

[Open Calculator !\[\]\(0ac73c45806a78de248a19d9a2dbe7a6_img.jpg\)](#)

$$ex \quad 10.00172m = \sqrt{\frac{1120m^2}{3 \cdot (2 + \sqrt{3})}}$$

27) Side of Dodecagon given Circumradius 

$$fx \quad S = \frac{r_c}{\frac{\sqrt{6} + \sqrt{2}}{2}}$$

[Open Calculator !\[\]\(d3d0bc9cbc0b5499f7bfafd3278057f7_img.jpg\)](#)

$$ex \quad 10.35276m = \frac{20m}{\frac{\sqrt{6} + \sqrt{2}}{2}}$$



28) Side of Dodecagon given Height

$$fx \quad S = \frac{h}{2 + \sqrt{3}}$$

[Open Calculator !\[\]\(8b57f0e15e7dda24cf9977561475f640_img.jpg\)](#)

$$ex \quad 9.91412m = \frac{37m}{2 + \sqrt{3}}$$

29) Side of Dodecagon given Perimeter

$$fx \quad S = \frac{P}{12}$$

[Open Calculator !\[\]\(ceb7cef9f9d693d102dfe501130037c6_img.jpg\)](#)

$$ex \quad 10m = \frac{120m}{12}$$

Width of Dodecagon

30) Width of Dodecagon

$$fx \quad w = (2 + \sqrt{3}) \cdot S$$

[Open Calculator !\[\]\(07e95c4c760ed8b72579d140ce510c89_img.jpg\)](#)

$$ex \quad 37.32051m = (2 + \sqrt{3}) \cdot 10m$$



31) Width of Dodecagon given Area

[Open Calculator !\[\]\(0cc5c4c18dd72a91e21b90220aef9c5d_img.jpg\)](#)

$$\text{fx } w = \sqrt{\frac{(2 + \sqrt{3}) \cdot A}{3}}$$

$$\text{ex } 37.32692\text{m} = \sqrt{\frac{(2 + \sqrt{3}) \cdot 1120\text{m}^2}{3}}$$

32) Width of Dodecagon given Inradius

[Open Calculator !\[\]\(3b71157eab31889e641f7620692f0b92_img.jpg\)](#)

$$\text{fx } w = 2 \cdot r_i$$

$$\text{ex } 38\text{m} = 2 \cdot 19\text{m}$$



Variables Used

- **A** Area of Dodecagon (Square Meter)
- **d₂** Diagonal Across Two Sides of Dodecagon (Meter)
- **d₃** Diagonal Across Three Sides of Dodecagon (Meter)
- **d₄** Diagonal Across Four Sides of Dodecagon (Meter)
- **d₅** Diagonal Across Five Sides of Dodecagon (Meter)
- **d₆** Diagonal Across Six Sides of Dodecagon (Meter)
- **h** Height of Dodecagon (Meter)
- **P** Perimeter of Dodecagon (Meter)
- **r_c** Circumradius of Dodecagon (Meter)
- **r_i** Inradius of Dodecagon (Meter)
- **S** Side of Dodecagon (Meter)
- **w** Width of Dodecagon (Meter)



Constants, Functions, Measurements used

- **Function:** **sqrt**, sqrt(Number)
Square root function
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion 
- **Measurement:** **Area** in Square Meter (m²)
Area Unit Conversion 



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