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Important Formulas of Decagon

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List of 25 Important Formulas of Decagon

Important Formulas of Decagon ⬈

Area of Decagon ⬈

1) Area of Decagon ⬈

Open Calculator ⬈

$$fx \quad A = \frac{5}{2} \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right) \cdot S^2}$$

$$ex \quad 769.4209 \text{m}^2 = \frac{5}{2} \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right) \cdot (10\text{m})^2}$$

2) Area of Decagon given Circumradius ⬈

Open Calculator ⬈

$$fx \quad A = \frac{5}{2} \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right) \cdot \left(\frac{2 \cdot r_c}{1 + \sqrt{5}}\right)^2}$$

$$ex \quad 752.3651 \text{m}^2 = \frac{5}{2} \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right) \cdot \left(\frac{2 \cdot 16\text{m}}{1 + \sqrt{5}}\right)^2}$$

3) Area of Decagon given Perimeter ⚹

fx $A = \dfrac{5}{2} \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right)} \cdot \left(\dfrac{P}{10}\right)^2$

ex $769.4209\text{m}^2 = \dfrac{5}{2} \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right)} \cdot \left(\dfrac{100\text{m}}{10}\right)^2$

Diagonal of Decagon ⚹

4) Diagonal of Decagon across Five Sides ⚹

fx $d_5 = \left(1 + \sqrt{5}\right) \cdot S$

ex $32.36068\text{m} = \left(1 + \sqrt{5}\right) \cdot 10\text{m}$

5) Diagonal of Decagon across Five Sides given Circumradius ⚹

fx $d_5 = 2 \cdot r_c$

ex $32\text{m} = 2 \cdot 16\text{m}$

6) Diagonal of Decagon across Four Sides ⚹

fx $d_4 = \sqrt{5 + \left(2 \cdot \sqrt{5}\right)} \cdot S$

ex $30.77684\text{m} = \sqrt{5 + \left(2 \cdot \sqrt{5}\right)} \cdot 10\text{m}$

7) Diagonal of Decagon across Four Sides given Inradius ⟁

fx $d_4 = (2 \cdot r_i)$

Open Calculator ⟁

ex $30m = (2 \cdot 15m)$

8) Diagonal of Decagon across Three Sides ⟁

Open Calculator ⟁

fx $d_3 = \dfrac{\sqrt{14 + \left(6 \cdot \sqrt{5}\right)}}{2} \cdot S$

ex $26.18034m = \dfrac{\sqrt{14 + \left(6 \cdot \sqrt{5}\right)}}{2} \cdot 10m$

9) Diagonal of Decagon across Two Sides ⟁

Open Calculator ⟁

fx $d_2 = \dfrac{\sqrt{10 + \left(2 \cdot \sqrt{5}\right)}}{2} \cdot S$

ex $19.02113m = \dfrac{\sqrt{10 + \left(2 \cdot \sqrt{5}\right)}}{2} \cdot 10m$

Height of Decagon ⤤

10) Height of Decagon ⤤

fx $h = \sqrt{5 + \left(2 \cdot \sqrt{5}\right)} \cdot S$

Open Calculator ⤤

ex $30.77684m = \sqrt{5 + \left(2 \cdot \sqrt{5}\right)} \cdot 10m$

11) Height of Decagon given Diagonal across Four Sides ⤤

fx $h = d_4 \cdot 1$

Open Calculator ⤤

ex $31m = 31m \cdot 1$

12) Height of Decagon given Width ⤤

Open Calculator ⤤

fx $h = \dfrac{\sqrt{5 + \left(2 \cdot \sqrt{5}\right)} \cdot w}{1 + \sqrt{5}}$

ex $30.43381m = \dfrac{\sqrt{5 + \left(2 \cdot \sqrt{5}\right)} \cdot 32m}{1 + \sqrt{5}}$

Perimeter of Decagon

13) Perimeter of Decagon

Open Calculator

fx $P = 10 \cdot S$

ex $100m = 10 \cdot 10m$

14) Perimeter of Decagon given Circumradius

Open Calculator

fx $P = 10 \cdot \dfrac{2 \cdot r_c}{1 + \sqrt{5}}$

ex $98.88544m = 10 \cdot \dfrac{2 \cdot 16m}{1 + \sqrt{5}}$

15) Perimeter of Decagon given Height

Open Calculator

fx $P = 10 \cdot \dfrac{h}{\sqrt{5 + \left(2 \cdot \sqrt{5}\right)}}$

ex $100.7251m = 10 \cdot \dfrac{31m}{\sqrt{5 + \left(2 \cdot \sqrt{5}\right)}}$

Radius of Decagon 🔗

16) Circumradius of Decagon 🔗

Open Calculator 🔗

$$fx \quad r_c = \frac{1 + \sqrt{5}}{2} \cdot S$$

$$ex \quad 16.18034m = \frac{1 + \sqrt{5}}{2} \cdot 10m$$

17) Circumradius of Decagon given Width 🔗

Open Calculator 🔗

$$fx \quad r_c = \frac{w}{2}$$

$$ex \quad 16m = \frac{32m}{2}$$

18) Inradius of Decagon 🔗

Open Calculator 🔗

$$fx \quad r_i = \frac{\sqrt{5 + \left(2 \cdot \sqrt{5}\right)}}{2} \cdot S$$

$$ex \quad 15.38842m = \frac{\sqrt{5 + \left(2 \cdot \sqrt{5}\right)}}{2} \cdot 10m$$

19) Inradius of Decagon given Height ⤴

fx $r_i = \dfrac{h}{2}$

Open Calculator ⤴

ex $15.5\text{m} = \dfrac{31\text{m}}{2}$

Side of Decagon ⤴

20) Side of Decagon given Area ⤴

fx $S = \sqrt{\dfrac{2 \cdot A}{5 \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right)}}}$

Open Calculator ⤴

ex $10.00376\text{m} = \sqrt{\dfrac{2 \cdot 770\text{m}^2}{5 \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right)}}}$

21) Side of Decagon given Circumradius ⤴

fx $S = \dfrac{2 \cdot r_c}{1 + \sqrt{5}}$

Open Calculator ⤴

ex $9.888544\text{m} = \dfrac{2 \cdot 16\text{m}}{1 + \sqrt{5}}$

22) Side of Decagon given Width 🔗

fx $S = w \cdot \sin\left(\dfrac{\pi}{10}\right)$

Open Calculator 🔗

ex $9.888544m = 32m \cdot \sin\left(\dfrac{\pi}{10}\right)$

Width of Decagon 🔗

23) Width of Decagon 🔗

fx $w = \dfrac{S}{\sin\left(\frac{\pi}{10}\right)}$

Open Calculator 🔗

ex $32.36068m = \dfrac{10m}{\sin\left(\frac{\pi}{10}\right)}$

24) Width of Decagon given Area 🔗

fx $w = \left(1 + \sqrt{5}\right) \cdot \sqrt{\dfrac{2 \cdot A}{5 \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right)}}}$

Open Calculator 🔗

ex $32.37286m = \left(1 + \sqrt{5}\right) \cdot \sqrt{\dfrac{2 \cdot 770m^2}{5 \cdot \sqrt{5 + \left(2 \cdot \sqrt{5}\right)}}}$

25) Width of Decagon given Diagonal across Five Sides ⤴

fx $\boxed{w = 1 \cdot d_5}$

ex $\boxed{32m = 1 \cdot 32m}$

Variables Used

- **A** Area of Decagon *(Square Meter)*
- **d$_2$** Diagonal across Two Sides of Decagon *(Meter)*
- **d$_3$** Diagonal across Three Sides of Decagon *(Meter)*
- **d$_4$** Diagonal across Four Sides of Decagon *(Meter)*
- **d$_5$** Diagonal across Five Sides of Decagon *(Meter)*
- **h** Height of Decagon *(Meter)*
- **P** Perimeter of Decagon *(Meter)*
- **r$_c$** Circumradius of Decagon *(Meter)*
- **r$_i$** Inradius of Decagon *(Meter)*
- **S** Side of Decagon *(Meter)*
- **w** Width of Decagon *(Meter)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant

- Function: **sin**, sin(Angle)
  Trigonometric sine function

- 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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