



Regular Polygon Formulas

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List of 28 Regular Polygon Formulas

Regular Polygon 🕑

Angles of Regular Polygon 🕑

1) Exterior Angle of Regular Polygon 🕑

fx
$$\angle_{
m Exterior} = rac{2\cdot\pi}{
m N_S}$$
 ex $45^\circ = rac{2\cdot\pi}{8}$

2) Interior Angle of Regular Polygon 子

fx
$$\angle_{
m Interior} = rac{(
m N_S-2)\cdot\pi}{
m N_S}$$
ex $135^\circ = rac{(8-2)\cdot\pi}{8}$

3) Interior Angle of Regular Polygon given Sum of Interior Angles 🖸



2/15

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4) Sum of Interior Angles of Regular Polygon 🚰

fx
$$\mathrm{Sum} ar{}_\mathrm{Interior} = (\mathrm{N_S} - 2) \cdot \pi$$

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

Area of Regular Polygon 🕑

5) Area of Regular Polygon 🕑

fx
$$\mathrm{A} = rac{\mathrm{l}_{\mathrm{e}}^2 \cdot \mathrm{N}_{\mathrm{S}}}{4 \cdot \mathrm{tan} \left(rac{\pi}{\mathrm{N}_{\mathrm{S}}}
ight)}$$

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

6) Area of Regular Polygon given Circumradius 子

$$\mathbf{fx} \mathbf{A} = \frac{\mathbf{r}_{c}^{2} \cdot \mathbf{N}_{S} \cdot \sin\left(\frac{2 \cdot \pi}{\mathbf{N}_{S}}\right)}{2}$$

$$\mathbf{ex} 478.0042 \mathbf{m}^{2} = \frac{(13\mathbf{m})^{2} \cdot 8 \cdot \sin\left(\frac{2 \cdot \pi}{8}\right)}{2}$$

Open Calculator 🕑



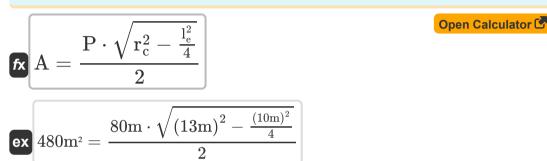
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7) Area of Regular Polygon given Inradius 🕑

fx
$$\mathbf{A} = \mathbf{r}_{\mathrm{i}}^2 \cdot \mathbf{N}_{\mathrm{S}} \cdot \mathrm{tan}\!\left(rac{\pi}{\mathbf{N}_{\mathrm{S}}}
ight)$$

ex
$$477.174m^2 = (12m)^2 \cdot 8 \cdot tan(\frac{\pi}{8})$$

8) Area of Regular Polygon given Perimeter and Circumradius 🕑



9) Area of Regular Polygon given Perimeter and Inradius 🕑

fx
$$A = \frac{P \cdot r_i}{2}$$

ex $480m^2 = \frac{80m \cdot 12m}{2}$



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Edge Length of Regular Polygon 🕑

10) Edge Length of Regular Polygon given Area 子

$$f_{X} = \frac{\sqrt{4 \cdot A \cdot tan\left(\frac{\pi}{N_{S}}\right)}}{\sqrt{N_{S}}}$$

$$f_{X} = \frac{\sqrt{4 \cdot A \cdot tan\left(\frac{\pi}{N_{S}}\right)}}{\sqrt{N_{S}}}$$

$$f_{X} = \frac{\sqrt{4 \cdot 480m^{2} \cdot tan\left(\frac{\pi}{8}\right)}}{\sqrt{8}}$$

$$f_{X} = \frac{\sqrt{4 \cdot 480m^{2} \cdot tan\left(\frac{\pi}{8}\right)}}{\sqrt{8}}$$

$$f_{X} = 2 \cdot r_{c} \cdot sin\left(\frac{\pi}{N_{S}}\right)$$

$$f_{X} = 2 \cdot r_{c} \cdot sin\left(\frac{\pi}{N_{S}}\right)$$

$$f_{X} = 2 \cdot r_{c} \cdot sin\left(\frac{\pi}{N_{S}}\right)$$

$$f_{X} = \frac{9.949769m}{2 \cdot 13m \cdot sin\left(\frac{\pi}{8}\right)}$$

$$f_{X} = r_{i} \cdot 2 \cdot tan\left(\frac{\pi}{N_{S}}\right)$$

$$f_{X} = r_{i} \cdot 2 \cdot tan\left(\frac{\pi}{N_{S}}\right)$$

$$f_{X} = r_{i} \cdot 2 \cdot tan\left(\frac{\pi}{N_{S}}\right)$$

$$f_{X} = 12m \cdot 2 \cdot tan\left(\frac{\pi}{8}\right)$$



13) Edge Length of Regular Polygon given Perimeter 🕑



Other Formulas of Regular Polygon C

14) Number of Diagonals of Regular Polygon 🕑

fx
$$N_{
m Diagonals}=rac{N_{
m S}\cdot(N_{
m S}-3)}{2}$$
 ex $20=rac{8\cdot(8-3)}{2}$

15) Number of Sides of Regular Polygon given Sum of Interior Angles 🚰

fx
$$\mathbf{N}_{\mathrm{S}} = \left(\frac{\mathrm{Sum}\angle_{\mathrm{Interior}}}{\pi}\right) + 2$$

ex $8 = \left(\frac{1080^{\circ}}{\pi}\right) + 2$



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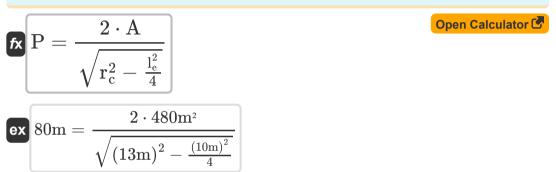
Perimeter of Regular Polygon 🕑

16) Perimeter of Regular Polygon 🖸

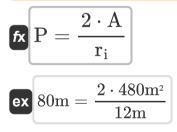
fx
$$\mathrm{P}=\mathrm{N}_{\mathrm{S}}\cdot\mathrm{l}_{\mathrm{e}}$$
 Open Calculator ${f G}$

ex $80m = 8 \cdot 10m$

17) Perimeter of Regular Polygon given Circumradius and Area 🕑



18) Perimeter of Regular Polygon given Inradius and Area 🕑







19) Perimeter of Regular Polygon given Number of Sides and Circumradius

 $\mathbf{v} = 2 \cdot \mathbf{r}_{\mathrm{c}} \cdot \mathbf{N}_{\mathrm{S}} \cdot \mathrm{sin} igg(rac{\pi}{\mathrm{N}_{\mathrm{S}}} igg) igg|$

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ex 79.59815m =
$$2 \cdot 13m \cdot 8 \cdot \sin\left(\frac{\pi}{8}\right)$$

20) Perimeter of Regular Polygon given Number of Sides and Inradius 🖆

fx
$$\mathrm{P} = 2 \cdot \mathrm{N_S} \cdot \mathrm{r_i} \cdot \mathrm{tan} igg(rac{\pi}{\mathrm{N_S}} igg)$$

ex 79.529m =
$$2 \cdot 8 \cdot 12m \cdot tan\left(\frac{\pi}{8}\right)$$

Radius of Regular Polygon 🕑

Circumradius of Regular Polygon 🕑

21) Circumradius of Regular Polygon 🕑

fx
$$\mathbf{r_c} = rac{\mathbf{l_e}}{2 \cdot \sin\left(rac{\pi}{N_S}
ight)}$$

ex $13.06563 \mathrm{m} = rac{10 \mathrm{m}}{2 \cdot \sin\left(rac{\pi}{8}
ight)}$





22) Circumradius of Regular Polygon given Area 🕑

$$fx \quad r_{c} = \sqrt{\frac{2 \cdot A}{N_{S} \cdot \sin\left(\frac{2 \cdot \pi}{N_{S}}\right)}}$$
ex
$$13.02711m = \sqrt{\frac{2 \cdot 480m^{2}}{8 \cdot \sin\left(\frac{2 \cdot \pi}{8}\right)}}$$
23) Circumradius of Regular Polygon given Inradius C
fx
$$r_{c} = \frac{r_{i}}{\cos\left(\frac{\pi}{N_{S}}\right)}$$
ex
$$12.98871m = \frac{12m}{\cos\left(\frac{\pi}{8}\right)}$$
24) Circumradius of Regular Polygon given Perimeter C

fx
$$\mathbf{r_c} = rac{\mathbf{P}}{2 \cdot \mathbf{N_S} \cdot \sin\left(rac{\pi}{\mathbf{N_S}}
ight)}$$
 ex $13.06563 \mathrm{m} = rac{80 \mathrm{m}}{2 \cdot 8 \cdot \sin\left(rac{\pi}{8}
ight)}$



$$\bigcirc$$

25) Inradius of Regular Polygon 🕑

fx
$$\mathbf{r_i} = rac{\mathbf{l_e}}{2 \cdot an\left(rac{\pi}{N_S}
ight)}$$
 ex $12.07107 \mathrm{m} = rac{10 \mathrm{m}}{2 \cdot an\left(rac{\pi}{8}
ight)}$

26) Inradius of Regular Polygon given Area 子

fx
$$\mathbf{r_i} = \sqrt{\frac{A}{N_S \cdot tan\left(\frac{\pi}{N_S}\right)}}$$

ex $12.03548m = \sqrt{\frac{480m^2}{8 \cdot tan\left(\frac{\pi}{8}\right)}}$

27) Inradius of Regular Polygon given Circumradius 🖸

fx
$$\mathbf{r}_{i} = \mathbf{r}_{c} \cdot \cos\left(\frac{\pi}{N_{S}}\right)$$

ex $12.01043m = 13m \cdot \cos\left(\frac{\pi}{8}\right)$





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28) Inradius of Regular Polygon given Perimeter 🕑

$$fx r_{i} = \frac{P}{2 \cdot N_{S} \cdot tan\left(\frac{\pi}{N_{S}}\right)}$$

$$ex 12.07107m = \frac{80m}{2 \cdot 8 \cdot tan\left(\frac{\pi}{8}\right)}$$





Variables Used

- ∠Exterior Exterior Angle of Regular Polygon (Degree)
- ∠Interior Interior Angle of Regular Polygon (Degree)
- A Area of Regular Polygon (Square Meter)
- **I**e Edge Length of Regular Polygon (Meter)
- Npiagonals Number of Diagonals of Regular Polygon
- N_S Number of Sides of Regular Polygon
- P Perimeter of Regular Polygon (Meter)
- **r**_c Circumradius of Regular Polygon (Meter)
- r_i Inradius of Regular Polygon (Meter)
- Sum∠Interior Sum of Interior Angles of Regular Polygon (Degree)



Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288 Archimedes' constant
- Function: cos, cos(Angle) Trigonometric cosine 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 (m²) Area Unit Conversion
- Measurement: Angle in Degree (°) Angle Unit Conversion

Check other formula lists

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- Antiparallelogram Formulas C
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- Astroid Formulas 🖸
- Bulge Formulas 🖸
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- Circular Arc Quadrangle
 Formulas
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- Concave Regular Hexagon
 Formulas
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- Grid Formulas 🗹
- H Shape Formulas 💪

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- Hexagram Formulas 🖸
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- Hyperbola Formulas C
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- Koch Curve Formulas C
- L Shape Formulas 🕑
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- Unicursal Hexagram Formulas 🖸
- X Shape Formulas 🗹

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