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Astroid Formulas

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List of 20 Astroid Formulas

Astroid

Area of Astroid

1) Area of Astroid

$$\text{fx } A = \frac{3}{8} \cdot \pi \cdot r_{\text{Fixed Circle}}^2$$

Open Calculator 

$$\text{ex } 75.39822\text{m}^2 = \frac{3}{8} \cdot \pi \cdot (8\text{m})^2$$

2) Area of Astroid given Chord Length

$$\text{fx } A = \frac{3}{8} \cdot \pi \cdot \left(\frac{l_c}{2 \cdot \sin\left(\frac{\pi}{4}\right)} \right)^2$$

Open Calculator 

$$\text{ex } 71.27488\text{m}^2 = \frac{3}{8} \cdot \pi \cdot \left(\frac{11\text{m}}{2 \cdot \sin\left(\frac{\pi}{4}\right)} \right)^2$$



3) Area of Astroid given Perimeter

$$\text{fx } A = \frac{3}{8} \cdot \pi \cdot \left(\frac{P}{6}\right)^2$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$\text{ex } 81.81231\text{m}^2 = \frac{3}{8} \cdot \pi \cdot \left(\frac{50\text{m}}{6}\right)^2$$

4) Area of Astroid given Radius of Rolling Circle

$$\text{fx } A = \frac{3}{8} \cdot \pi \cdot (4 \cdot r_{\text{Rolling circle}})^2$$

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

$$\text{ex } 75.39822\text{m}^2 = \frac{3}{8} \cdot \pi \cdot (4 \cdot 2\text{m})^2$$

Chord Length of Astroid

5) Chord Length of Astroid

$$\text{fx } l_c = 2 \cdot r_{\text{Fixed Circle}} \cdot \sin\left(\frac{\pi}{4}\right)$$

[Open Calculator !\[\]\(b792654f2cef9719eabeb6c5be00811e_img.jpg\)](#)

$$\text{ex } 11.31371\text{m} = 2 \cdot 8\text{m} \cdot \sin\left(\frac{\pi}{4}\right)$$



6) Chord Length of Astroid given Area [Open Calculator !\[\]\(dfbd6b3763a6d1d9afaa974f64e2e4b5_img.jpg\)](#)


$$fx \quad l_c = 2 \cdot \sqrt{\frac{8 \cdot A}{3 \cdot \pi}} \cdot \sin\left(\frac{\pi}{4}\right)$$

$$ex \quad 11.28379m = 2 \cdot \sqrt{\frac{8 \cdot 75m^2}{3 \cdot \pi}} \cdot \sin\left(\frac{\pi}{4}\right)$$

7) Chord Length of Astroid given Perimeter [Open Calculator !\[\]\(ec9132f1d27c8919987d92907322654d_img.jpg\)](#)


$$fx \quad l_c = \frac{P}{3} \cdot \sin\left(\frac{\pi}{4}\right)$$

$$ex \quad 11.78511m = \frac{50m}{3} \cdot \sin\left(\frac{\pi}{4}\right)$$

8) Chord Length of Astroid given Radius of Rolling Circle [Open Calculator !\[\]\(758ebdf4629c903da74c2e079717ae32_img.jpg\)](#)

$$fx \quad l_c = 8 \cdot r_{\text{Rolling circle}} \cdot \sin\left(\frac{\pi}{4}\right)$$

$$ex \quad 11.31371m = 8 \cdot 2m \cdot \sin\left(\frac{\pi}{4}\right)$$

Perimeter of Astroid 9) Perimeter of Astroid [Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b_img.jpg\)](#)

$$fx \quad P = 6 \cdot r_{\text{Fixed Circle}}$$

$$ex \quad 48m = 6 \cdot 8m$$



10) Perimeter of Astroid given Area

$$\text{fx } P = 6 \cdot \sqrt{\frac{8 \cdot A}{3 \cdot \pi}}$$

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

$$\text{ex } 47.87307\text{m} = 6 \cdot \sqrt{\frac{8 \cdot 75\text{m}^2}{3 \cdot \pi}}$$

11) Perimeter of Astroid given Chord Length

$$\text{fx } P = 6 \cdot \left(\frac{l_c}{2 \cdot \sin\left(\frac{\pi}{4}\right)} \right)$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)

$$\text{ex } 46.66905\text{m} = 6 \cdot \left(\frac{11\text{m}}{2 \cdot \sin\left(\frac{\pi}{4}\right)} \right)$$

12) Perimeter of Astroid given Radius of Rolling Circle

$$\text{fx } P = 24 \cdot r_{\text{Rolling circle}}$$

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)](#)

$$\text{ex } 48\text{m} = 24 \cdot 2\text{m}$$

Radius of Fixed Circle of Astroid

13) Radius of Fixed Circle of Astroid

$$\text{fx } r_{\text{Fixed Circle}} = 4 \cdot r_{\text{Rolling circle}}$$

[Open Calculator !\[\]\(e50091943b385fe16d3277389202856f_img.jpg\)](#)

$$\text{ex } 8\text{m} = 4 \cdot 2\text{m}$$



14) Radius of Fixed Circle of Astroid given Area

$$\text{fx } r_{\text{Fixed Circle}} = \sqrt{\frac{8 \cdot A}{3 \cdot \pi}}$$

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

$$\text{ex } 7.978846\text{m} = \sqrt{\frac{8 \cdot 75\text{m}^2}{3 \cdot \pi}}$$

15) Radius of Fixed Circle of Astroid given Chord Length

$$\text{fx } r_{\text{Fixed Circle}} = \frac{l_c}{2 \cdot \sin\left(\frac{\pi}{4}\right)}$$

[Open Calculator !\[\]\(e1d6102fe77919492c04879c8450f1f5_img.jpg\)](#)

$$\text{ex } 7.778175\text{m} = \frac{11\text{m}}{2 \cdot \sin\left(\frac{\pi}{4}\right)}$$

16) Radius of Fixed Circle of Astroid given Perimeter

$$\text{fx } r_{\text{Fixed Circle}} = \frac{P}{6}$$

[Open Calculator !\[\]\(ab4e2b3fc7e7887b7a72f548aa6f5e60_img.jpg\)](#)

$$\text{ex } 8.333333\text{m} = \frac{50\text{m}}{6}$$



Radius of Rolling circle of Astroid

17) Radius of Rolling Circle of Astroid

$$\text{fx } r_{\text{Rolling circle}} = \frac{r_{\text{Fixed Circle}}}{4}$$

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

$$\text{ex } 2\text{m} = \frac{8\text{m}}{4}$$

18) Radius of Rolling Circle of Astroid given Area

$$\text{fx } r_{\text{Rolling circle}} = \frac{1}{4} \cdot \sqrt{\frac{8 \cdot A}{3 \cdot \pi}}$$

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

$$\text{ex } 1.994711\text{m} = \frac{1}{4} \cdot \sqrt{\frac{8 \cdot 75\text{m}^2}{3 \cdot \pi}}$$

19) Radius of Rolling Circle of Astroid given Chord Length

$$\text{fx } r_{\text{Rolling circle}} = \frac{1}{4} \cdot \frac{l_c}{2 \cdot \sin\left(\frac{\pi}{4}\right)}$$

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

$$\text{ex } 1.944544\text{m} = \frac{1}{4} \cdot \frac{11\text{m}}{2 \cdot \sin\left(\frac{\pi}{4}\right)}$$



20) Radius of Rolling Circle of Astroid given Perimeter

$$\text{fx } r_{\text{Rolling circle}} = \frac{P}{24}$$

[Open Calculator !\[\]\(6605b201d6f14d9b3bcb8ab5f274d107_img.jpg\)](#)

$$\text{ex } 2.083333\text{m} = \frac{50\text{m}}{24}$$





Variables Used

- **A** Area of Astroid (Square Meter)
- **l_c** Chord Length of Astroid (Meter)
- **P** Perimeter of Astroid (Meter)
- **r**Fixed Circle Radius of Fixed Circle of Astroid (Meter)
- **r**Rolling circle Radius of Rolling Circle of Astroid (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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