Important Astroid Formulas PDF

Formulas
Examples
with Units

List of 20
Important Astroid Formulas

1) Area of Astroid Formulas

1.1) Area of Astroid Formula

Evaluate Formula

Formula

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

Example with Units

$$75.3982\,\text{m}^2 = \frac{3}{8} \cdot 3.1416 \cdot 8\,\text{m}^2$$

1.2) Area of Astroid given Chord Length Formula

Evaluate Formula

Formula

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

Example with Units

$$71.2749\,\text{m}^2 = \frac{3}{8} \cdot 3.1416 \cdot \left(\frac{11\,\text{m}}{2 \cdot \sin\left(\frac{3.1416}{4}\right)} \right)^2$$

1.3) Area of Astroid given Perimeter Formula

Evaluate Formula

Formula

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

Example with Units

$$81.8123\,\text{m}^2 = \frac{3}{8} \cdot 3.1416 \cdot \left(\frac{50\,\text{m}}{6} \right)^2$$

1.4) Area of Astroid given Radius of Rolling Circle Formula

Evaluate Formula

Formula

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

Example with Units

$$75.3982\,\text{m}^2 = \frac{3}{8} \cdot 3.1416 \cdot \left(4 \cdot 2\,\text{m} \right)^2$$

2) Chord Length of Astroid Formulas

2.1) Chord Length of Astroid Formula

Evaluate Formula

Formula

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

Example with Units

$$11.3137\,\text{m} = 2 \cdot 8\,\text{m} \cdot \sin\left(\frac{3.1416}{4}\right)$$

2.2) Chord Length of Astroid given Area Formula

Evaluate Formula

Formula

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

Example with Units

$$11.2838\,\text{m} = 2 \cdot \sqrt{\frac{8 \cdot 75\,\text{m}^2}{3 \cdot 3.1416}} \cdot \sin\left(\frac{3.1416}{4}\right)$$

2.3) Chord Length of Astroid given Perimeter Formula

Evaluate Formula

Formula

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

Example with Units

$$11.7851\,\text{m} = \frac{50\,\text{m}}{3} \cdot \sin\left(\frac{3.1416}{4}\right)$$

2.4) Chord Length of Astroid given Radius of Rolling Circle Formula

Evaluate Formula

Formula

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

Example with Units

$$11.3137\,\text{m} = 8 \cdot 2\,\text{m} \cdot \sin\left(\frac{3.1416}{4}\right)$$

3) Perimeter of Astroid Formulas

3.1) Perimeter of Astroid Formula

Evaluate Formula

Formula

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

Example with Units

$$48\,\text{m} = 6 \cdot 8\,\text{m}$$

3.2) Perimeter of Astroid given Area Formula

Evaluate Formula

Formula

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

Example with Units

$$47.8731\,\text{m} = 6 \cdot \sqrt{\frac{8 \cdot 75\,\text{m}^2}{3 \cdot 3.1416}}$$

3.3) Perimeter of Astroid given Chord Length Formula

Evaluate Formula

Formula

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

Example with Units

$$46.669\,\text{m} = 6 \cdot \left(\frac{11\,\text{m}}{2 \cdot \sin\left(\frac{3.1416}{4}\right)}\right)$$

3.4) Perimeter of Astroid given Radius of Rolling Circle Formula

Evaluate Formula

Formula

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

Example with Units

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

4) Radius of Fixed Circle of Astroid Formulas

4.1) Radius of Fixed Circle of Astroid Formula

Evaluate Formula

Formula

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

Example with Units

$$8\,m = 4 \cdot 2\,m$$

4.2) Radius of Fixed Circle of Astroid given Area Formula

Evaluate Formula

Formula

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

Example with Units

$$7.9788\,m = \sqrt{\frac{8 \cdot 75\,m^2}{3 \cdot 3.1416}}$$

4.3) Radius of Fixed Circle of Astroid given Chord Length Formula

Evaluate Formula

Formula

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

Example with Units

$$7.7782\,m = \frac{11\,m}{2 \cdot \sin\left(\frac{3.1416}{4}\right)}$$

4.4) Radius of Fixed Circle of Astroid given Perimeter Formula

Evaluate Formula

Formula

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

Example with Units

$$8.3333\,m = \frac{50\,m}{6}$$

5) Radius of Rolling circle of Astroid Formulas

5.1) Radius of Rolling Circle of Astroid Formula

Evaluate Formula

Formula

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

Example with Units

$$2\,m = \frac{8\,m}{4}$$

5.2) Radius of Rolling Circle of Astroid given Area Formula

Evaluate Formula

Formula

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

Example with Units

$$1.9947\,m = \frac{1}{4} \cdot \sqrt{\frac{8 \cdot 75\,m^2}{3 \cdot 3.1416}}$$

5.3) Radius of Rolling Circle of Astroid given Chord Length Formula

Evaluate Formula

Formula

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

Example with Units

$$1.9445\,m = \frac{1}{4} \cdot \frac{11\,m}{2 \cdot \sin\left(\frac{3.1416}{4}\right)}$$

5.4) Radius of Rolling Circle of Astroid given Perimeter Formula

Evaluate Formula

Formula

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

Example with Units

$$2.0833\,\text{m} = \frac{50\,\text{m}}{24}$$

Variables used in list of Astroid Formulas above

- **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 in list of Astroid Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- Functions: **sin**, sin(Angle) *Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.*
- Functions: **sqrt**, sqrt(Number) *A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.*
- Measurement: **Length** in Meter (m) *Length Unit Conversion*
- Measurement: **Area** in Square Meter (m²) *Area Unit Conversion*

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