Important Cycloid Formulas PDF

Formulas
Examples
with Units

List of 30
Important Cycloid Formulas

1) Area of Cycloid Formulas

1.1) Area of Cycloid Formula

Evaluate Formula

Formula

$$A = 3 \cdot \pi \cdot r_{Circle}^{2}$$

Example with Units

$$235.6194\,\text{m}^2 = 3 \cdot 3.1416 \cdot 5\,\text{m}^{2}$$

1.2) Area of Cycloid given Arc Length Formula

Evaluate Formula

Formula

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

Example with Units

$$235.6194\,\text{m}^2 = 3 \cdot 3.1416 \cdot \left(\frac{40\,\text{m}}{8}\right)^{2}$$

1.3) Area of Cycloid given Base Length Formula

Evaluate Formula

Formula

$$A = 3 \cdot \pi \cdot \left(\frac{l_{Base}}{2 \cdot \pi}\right)^{2}$$

Example with Units

$$214.8592\,\text{m}^2 = 3 \cdot 3.1416 \cdot \left(\frac{30\,\text{m}}{2 \cdot 3.1416}\right)^{2}$$

1.4) Area of Cycloid given Height Formula

Evaluate Formula

Formula

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

Example with Units

$$235.6194\,\text{m}^2 = 3 \cdot 3.1416 \cdot \left(\frac{10\,\text{m}}{2}\right)^{2}$$

1.5) Area of Cycloid given Perimeter Formula

Evaluate Formula

Formula

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

Example with Units

$$226.3691\,\text{m}^2 = 3 \cdot 3.1416 \cdot \left(\frac{70\,\text{m}}{8 + (2 \cdot 3.1416)}\right)^{2}$$

2) Height of Cycloid Formulas

2.1) Height of Cycloid Formula

Evaluate Formula

Formula

$$h = 2 \cdot r_{Circle}$$

Example with Units

$$10\,\text{m} = 2 \cdot 5\,\text{m}$$

2.2) Height of Cycloid given Arc Length Formula

Evaluate Formula

Formula

$$h = \frac{l_{Arc}}{4}$$

Example with Units

$$10\,\text{m} = \frac{40\,\text{m}}{4}$$

2.3) Height of Cycloid given Area Formula

Evaluate Formula

Formula

$$h = 2 \cdot \sqrt{\frac{A}{3 \cdot \pi}}$$

Example with Units

$$9.9868\,\text{m} = 2 \cdot \sqrt{\frac{235\,\text{m}^2}{3 \cdot 3.1416}}$$

2.4) Height of Cycloid given Base Length Formula

Evaluate Formula

Formula

$$h = \frac{l_{Base}}{\pi}$$

Example with Units

$$9.5493\,\text{m} = \frac{30\,\text{m}}{3.1416}$$

2.5) Height of Cycloid given Perimeter Formula

Evaluate Formula

Formula

$$h = \frac{2 \cdot P}{8 + \left(2 \cdot \pi\right)}$$

Example with Units

$$9.8017\,\text{m} = \frac{2 \cdot 70\,\text{m}}{8 + \left(2 \cdot 3.1416\right)}$$

3) Length of Cycloid Formulas

3.1) Arc Length of Cycloid Formulas

3.1.1) Arc Length of Cycloid Formula

Evaluate Formula

Formula

$$l_{Arc} = 8 \cdot r_{Circle}$$

Example with Units

$$40\,\text{m} = 8 \cdot 5\,\text{m}$$

3.1.2) Arc Length of Cycloid given Area Formula

Evaluate Formula

Formula

$$l_{Arc} = 8 \cdot \sqrt{\frac{A}{3 \cdot \pi}}$$

Example with Units

$$39.9474\,\text{m} = 8 \cdot \sqrt{\frac{235\,\text{m}^2}{3 \cdot 3.1416}}$$

3.1.3) Arc Length of Cycloid given Base Length Formula

Evaluate Formula

Formula

$$l_{Arc} = \frac{4 \cdot l_{Base}}{\pi}$$

Example with Units

$$38.1972\,\text{m} = \frac{4 \cdot 30\,\text{m}}{3.1416}$$

3.1.4) Arc Length of Cycloid given Height Formula

Evaluate Formula

Formula

$$l_{Arc} = 4 \cdot h$$

Example with Units

$$40\,\text{m} = 4 \cdot 10\,\text{m}$$

3.1.5) Arc Length of Cycloid given Perimeter Formula

Evaluate Formula

Formula

$$l_{Arc} = \frac{8 \cdot P}{8 + (2 \cdot \pi)}$$

Example with Units

$$39.2069\,\text{m} = \frac{8 \cdot 70\,\text{m}}{8 + (2 \cdot 3.1416)}$$

3.2) Base Length of Cycloid Formulas

3.2.1) Base Length of Cycloid Formula

Evaluate Formula

Formula

$$l_{Base} = 2 \cdot \pi \cdot r_{Circle}$$

Example with Units

$$31.4159\,\text{m} = 2 \cdot 3.1416 \cdot 5\,\text{m}$$

3.2.2) Base Length of Cycloid given Arc Length Formula

Evaluate Formula

Formula

$$l_{Base} = \frac{\pi}{4} \cdot l_{Arc}$$

Example with Units

$$31.4159\,\text{m} = \frac{3.1416}{4} \cdot 40\,\text{m}$$

3.2.3) Base Length of Cycloid given Area Formula

Evaluate Formula

Formula

$$l_{Base} = 2 \cdot \pi \cdot \sqrt{\frac{A}{3 \cdot \pi}}$$

Example with Units

$$31.3746\,\text{m} = 2 \cdot 3.1416 \cdot \sqrt{\frac{235\,\text{m}^2}{3 \cdot 3.1416}}$$

3.2.4) Base Length of Cycloid given Height Formula

Evaluate Formula

Formula

$$l_{Base} = \pi \cdot h$$

Example with Units

$$31.4159\,\text{m} = 3.1416 \cdot 10\,\text{m}$$

3.2.5) Base Length of Cycloid given Perimeter Formula

Evaluate Formula

Formula

$$l_{Base} = \frac{2 \cdot \pi \cdot P}{8 + (2 \cdot \pi)}$$

Example with Units

$$30.7931\,\text{m} = \frac{2 \cdot 3.1416 \cdot 70\,\text{m}}{8 + (2 \cdot 3.1416)}$$

4) Perimeter of Cycloid Formulas

4.1) Perimeter of Cycloid Formula

Evaluate Formula

Formula

$$P = (8 + (2 \cdot \pi)) \cdot r_{Circle}$$

Example with Units

$$71.4159\,\text{m} = (8 + (2 \cdot 3.1416)) \cdot 5\,\text{m}$$

4.2) Perimeter of Cycloid given Arc Length Formula

Evaluate Formula

Formula

$$P = (8 + (2 \cdot \pi)) \cdot \frac{l_{Arc}}{8}$$

Example with Units

$$71.4159\,\text{m} = (8 + (2 \cdot 3.1416)) \cdot \frac{40\,\text{m}}{8}$$

4.3) Perimeter of Cycloid given Area Formula

Evaluate Formula

Formula

$$P = (8 + (2 \cdot \pi)) \cdot \sqrt{\frac{A}{3 \cdot \pi}}$$

Example with Units

$$71.322\,\text{m} = (8 + (2 \cdot 3.1416)) \cdot \sqrt{\frac{235\,\text{m}^2}{3 \cdot 3.1416}}$$

4.4) Perimeter of Cycloid given Base Length Formula

Evaluate Formula

Formula

$$P = (8 + (2 \cdot \pi)) \cdot \frac{l_{Base}}{2 \cdot \pi}$$

Example with Units

$$68.1972\,\text{m} = (8 + (2 \cdot 3.1416)) \cdot \frac{30\,\text{m}}{2 \cdot 3.1416}$$

4.5) Perimeter of Cycloid given Height Formula

Evaluate Formula

Formula

$$P = (8 + (2 \cdot \pi)) \cdot \frac{h}{2}$$

Example with Units

$$71.4159\,\text{m} = (8 + (2 \cdot 3.1416)) \cdot \frac{10\,\text{m}}{2}$$

5) Radius of Circle of Cycloid Formulas

5.1) Radius of Circle of Cycloid given Arc Length Formula

Evaluate Formula

Formula

$$r_{Circle} = \frac{l_{Arc}}{8}$$

Example with Units

$$5\,\text{m} = \frac{40\,\text{m}}{8}$$

5.2) Radius of Circle of Cycloid given Area Formula

Evaluate Formula

Formula

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

Example with Units

$$4.9934\,\text{m} = \sqrt{\frac{235\,\text{m}^2}{3 \cdot 3.1416}}$$

5.3) Radius of Circle of Cycloid given Base Length Formula

Evaluate Formula

Formula

$$r_{Circle} = \frac{l_{Base}}{2 \cdot \pi}$$

Example with Units

$$4.7746\,\text{m} = \frac{30\,\text{m}}{2 \cdot 3.1416}$$

5.4) Radius of Circle of Cycloid given Height Formula

Evaluate Formula

Formula

$$r_{Circle} = \frac{h}{2}$$

Example with Units

$$5\,\text{m} = \frac{10\,\text{m}}{2}$$

5.5) Radius of Circle of Cycloid given Perimeter Formula

Evaluate Formula

Formula

$$r_{Circle} = \frac{P}{8 + \left(2 \cdot \pi\right)}$$

Example with Units

$$4.9009\,\text{m} = \frac{70\,\text{m}}{8 + \left(2 \cdot 3.1416\right)}$$

Variables used in list of Cycloid Formulas above

- **A** Area of Cycloid *(Square Meter)*
- **h** Height of Cycloid *(Meter)*
- l_{Arc} Arc Length of Cycloid *(Meter)*
- l_{Base} Base Length of Cycloid *(Meter)*
- **P** Perimeter of Cycloid *(Meter)*
- r_{Circle} Radius of Circle of Cycloid *(Meter)*

Constants, Functions, Measurements used in list of Cycloid Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- 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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