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Elliptical Shapes and Sub Sections Formulas

Calculators! Examples! Conversions!

List of 26 Elliptical Shapes and Sub Sections Formulas

Elliptical Shapes and Sub Sections

Elliptical Ring

Area of Elliptical Ring

1) Area of Elliptical Ring

Open Calculator

fx $A_{Ring} = \pi \cdot ((a_{Outer} \cdot b_{Outer}) - (a_{Inner} \cdot b_{Inner}))$

ex $141.3717m^2 = \pi \cdot ((10m \cdot 8m) - (7m \cdot 5m))$

2) Area of Elliptical Ring given Linear Eccentricities and Semi Major Axes

Open Calculator

fx $A_{Ring} = \pi \cdot \left(\left(\sqrt{a_{Outer}^2 - c_{Outer}^2} \cdot a_{Outer} \right) - \left(\sqrt{a_{Inner}^2 - c_{Inner}^2} \cdot a_{Inner} \right) \right)$

ex $124.9979m^2 = \pi \cdot \left(\left(\sqrt{(10m)^2 - (6m)^2} \cdot 10m \right) - \left(\sqrt{(7m)^2 - (4m)^2} \cdot 7m \right) \right)$

3) Area of Elliptical Ring given Linear Eccentricities and Semi Minor Axes

Open Calculator

fx $A_{Ring} = \pi \cdot \left(\left(\sqrt{b_{Outer}^2 + c_{Outer}^2} \cdot b_{Outer} \right) - \left(\sqrt{b_{Inner}^2 + c_{Inner}^2} \cdot b_{Inner} \right) \right)$

ex $150.7474m^2 = \pi \cdot \left(\left(\sqrt{(8m)^2 + (6m)^2} \cdot 8m \right) - \left(\sqrt{(5m)^2 + (4m)^2} \cdot 5m \right) \right)$

4) Area of Elliptical Ring given Width and Outer Semi Axes

Open Calculator

fx $A_{Ring} = \pi \cdot ((a_{Outer} \cdot b_{Outer}) - ((a_{Outer} - w_{Ring}) \cdot (b_{Outer} - w_{Ring})))$

ex $141.3717m^2 = \pi \cdot ((10m \cdot 8m) - ((10m - 3m) \cdot (8m - 3m)))$

Inner Axis of Elliptical Ring

5) Inner Semi Major Axis of Elliptical Ring

Open Calculator

fx $a_{Inner} = a_{Outer} - w_{Ring}$

ex $7m = 10m - 3m$

6) Inner Semi Minor Axis of Elliptical Ring

fx $b_{Inner} = b_{Outer} - w_{Ring}$

Open Calculator

ex $5m = 8m - 3m$

Outer Axis of Elliptical Ring

7) Outer Semi Major Axis of Elliptical Ring

fx $a_{Outer} = a_{Inner} + w_{Ring}$

Open Calculator

ex $10m = 7m + 3m$

8) Outer Semi Minor Axis of Elliptical Ring

fx $b_{Outer} = b_{Inner} + w_{Ring}$

Open Calculator

ex $8m = 5m + 3m$

Ring Width of Elliptical Ring

9) Ring Width of Elliptical Ring given Outer and Inner Semi Major Axes

fx $w_{Ring} = a_{Outer} - a_{Inner}$

Open Calculator

ex $3m = 10m - 7m$

10) Ring Width of Elliptical Ring given Outer and Inner Semi Minor Axes

fx $w_{Ring} = b_{Outer} - b_{Inner}$

Open Calculator

ex $3m = 8m - 5m$

Elliptical Sector

11) Angle of Elliptical Sector

fx $\angle_{Sector} = \angle_{Leg(2)} - \angle_{Leg(1)}$

Open Calculator

ex $90° = 120° - 30°$

12) Area of Elliptical Sector

Open Calculator

fx
$$A_{Sec} = \left(\frac{a_{Sector} \cdot b_{Sector}}{2}\right) \cdot \left(\angle_{Sector} - a\tan\left(\frac{(b_{Sector} - a_{Sector}) \cdot \sin(2 \cdot \angle_{Leg(2)})}{a_{Sector} + b_{Sector} + ((b_{Sector} - a_{Sector}) \cdot \cos(2 \cdot \right.\right.$$

ex
$$34.14321m^2 = \left(\frac{10m \cdot 6m}{2}\right) \cdot \left(90^\circ - a\tan\left(\frac{(6m - 10m) \cdot \sin(2 \cdot 120^\circ)}{10m + 6m + ((6m - 10m) \cdot \cos(2 \cdot 120^\circ))}\right) + a\tan\left(\frac{(}{10m + 6\right.\right.$$

13) First Leg Angle of Elliptical Sector

Open Calculator

fx
$$\angle_{Leg(1)} = \angle_{Leg(2)} - \angle_{Sector}$$

ex
$$30^\circ = 120^\circ - 90^\circ$$

14) First Leg of Elliptical Sector

Open Calculator

fx
$$l_1 = \sqrt{\frac{a_{Sector}^2 \cdot b_{Sector}^2}{\left(a_{Sector}^2 \cdot \sin(\angle_{Leg(1)})^2\right) + \left(b_{Sector}^2 \cdot \cos(\angle_{Leg(1)})^2\right)}}$$

ex
$$8.320503m = \sqrt{\frac{(10m)^2 \cdot (6m)^2}{\left((10m)^2 \cdot \sin(30^\circ)^2\right) + \left((6m)^2 \cdot \cos(30^\circ)^2\right)}}$$

15) Second Leg Angle of Elliptical Sector

Open Calculator

fx
$$\angle_{Leg(2)} = \angle_{Sector} + \angle_{Leg(1)}$$

ex
$$120^\circ = 90^\circ + 30^\circ$$

16) Second Leg of Elliptical Sector

Open Calculator

fx
$$l_2 = \sqrt{\frac{a_{Sector}^2 \cdot b_{Sector}^2}{\left(a_{Sector}^2 \cdot \sin(\angle_{Leg(2)})^2\right) + \left(b_{Sector}^2 \cdot \cos(\angle_{Leg(2)})^2\right)}}$$

ex
$$6.546537m = \sqrt{\frac{(10m)^2 \cdot (6m)^2}{\left((10m)^2 \cdot \sin(120^\circ)^2\right) + \left((6m)^2 \cdot \cos(120^\circ)^2\right)}}$$

Elliptical Segment

17) Area of Elliptical Segment

fx Open Calculator

$$A_{Segment} = \left(\frac{2a \cdot 2b}{4}\right) \cdot \left(\arccos\left(1 - \left(\frac{2 \cdot h_{Segment}}{2a}\right)\right) - \left(1 - \left(\frac{2 \cdot h_{Segment}}{2a}\right)\right) \cdot \sqrt{\left(\frac{4 \cdot I}{\ldots}\right.}\right.$$

ex

$$26.83771m^2 = \left(\frac{20m \cdot 12m}{4}\right) \cdot \left(\arccos\left(1 - \left(\frac{2 \cdot 4m}{20m}\right)\right) - \left(1 - \left(\frac{2 \cdot 4m}{20m}\right)\right) \cdot \sqrt{\left(\frac{4 \cdot 4m}{20m}\right) - \left(\frac{4 \cdot (4m)^2}{(20m)^2}\right.}\right.$$

18) Major Axis of Elliptical Segment

fx Open Calculator

$$2a = 2 \cdot a_{Segment}$$

ex

$$20m = 2 \cdot 10m$$

19) Minor Axis of Elliptical Segment

fx Open Calculator

$$2b = 2 \cdot b_{Segment}$$

ex

$$12m = 2 \cdot 6m$$

20) Semi Major Axis of Elliptical Segment

fx Open Calculator

$$a_{Segment} = \frac{2a}{2}$$

ex

$$10m = \frac{20m}{2}$$

21) Semi Minor Axis of Elliptical Segment

fx Open Calculator

$$b_{Segment} = \frac{2b}{2}$$

ex

$$6m = \frac{12m}{2}$$

Semi Ellipse

22) Arc Length of Semi Ellipse given Perimeter

Open Calculator

fx $$l_{Arc} = P - (2 \cdot s_{Axis})$$

ex $$25\text{m} = 45\text{m} - (2 \cdot 10\text{m})$$

23) Area of Semi Ellipse

Open Calculator

fx $$A_{Semi} = \left(\frac{\pi}{2}\right) \cdot s_{Axis} \cdot h_{Semi}$$

ex $$94.24778\text{m}^2 = \left(\frac{\pi}{2}\right) \cdot 10\text{m} \cdot 6\text{m}$$

24) Height of Semi Ellipse given Area

Open Calculator

fx $$h_{Semi} = \frac{2 \cdot A_{Semi}}{\pi \cdot s_{Axis}}$$

ex $$6.047888\text{m} = \frac{2 \cdot 95\text{m}^2}{\pi \cdot 10\text{m}}$$

25) Perimeter of Semi Ellipse

Open Calculator

fx $$P = (2 \cdot s_{Axis}) + l_{Arc}$$

ex $$45\text{m} = (2 \cdot 10\text{m}) + 25\text{m}$$

26) Semi Axis of Semi Ellipse given Area

Open Calculator

fx $$s_{Axis} = \frac{2 \cdot A_{Semi}}{\pi \cdot h_{Semi}}$$

ex $$10.07981\text{m} = \frac{2 \cdot 95\text{m}^2}{\pi \cdot 6\text{m}}$$

Variables Used

- $\angle_{Leg(1)}$ First Leg Angle of Elliptical Sector *(Degree)*
- $\angle_{Leg(2)}$ Second Leg Angle of Elliptical Sector *(Degree)*
- $\angle_{Sector}$ Angle of Elliptical Sector *(Degree)*
- **2a** Major Axis of Elliptical Segment *(Meter)*
- **2b** Minor Axis of Elliptical Segment *(Meter)*
- a_{Inner} Inner Semi Major Axis of Elliptical Ring *(Meter)*
- a_{Outer} Outer Semi Major Axis of Elliptical Ring *(Meter)*
- A_{Ring} Area of Elliptical Ring *(Square Meter)*
- A_{Sec} Area of Elliptical Sector *(Square Meter)*
- a_{Sector} Semi Major Axis of Elliptical Sector *(Meter)*
- $a_{Segment}$ Semi Major Axis of Elliptical Segment *(Meter)*
- $A_{Segment}$ Area of Elliptical Segment *(Square Meter)*
- A_{Semi} Area of Semi Ellipse *(Square Meter)*
- b_{Inner} Inner Semi Minor Axis of Elliptical Ring *(Meter)*
- b_{Outer} Outer Semi Minor Axis of Elliptical Ring *(Meter)*
- b_{Sector} Semi Minor Axis of Elliptical Sector *(Meter)*
- $b_{Segment}$ Semi Minor Axis of Elliptical Segment *(Meter)*
- c_{Inner} Inner Linear Eccentricity of Elliptical Ring *(Meter)*
- c_{Outer} Outer Linear Eccentricity of Elliptical Ring *(Meter)*
- $h_{Segment}$ Height of Elliptical Segment *(Meter)*
- h_{Semi} Height of Semi Ellipse *(Meter)*
- l_1 First Leg of Elliptical Sector *(Meter)*
- l_2 Second Leg of Elliptical Sector *(Meter)*
- l_{Arc} Arc Length of Semi Ellipse *(Meter)*
- **P** Perimeter of Semi Ellipse *(Meter)*
- s_{Axis} Semi Axis of Semi Ellipse *(Meter)*
- w_{Ring} Ring Width of Elliptical Ring *(Meter)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **arccos**, arccos(Number)
  Arccosine function, is the inverse function of the cosine function.It is the function that takes a ratio as an input and returns the angle whose cosine is equal to that ratio.
- Function: **atan**, atan(Number)
  Inverse tan is used to calculate the angle by applying the tangent ratio of the angle, which is the opposite side divided by the adjacent side of the right triangle.
- Function: **cos**, cos(Angle)
  Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.
- Function: **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.
- Function: **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.
- Function: **tan**, tan(Angle)
  The tangent of an angle is a trigonometric ratio of the length of the side opposite an angle to the length of the side adjacent to an angle in a right triangle.
- 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

- **Ellipse Formulas**
- **Elliptical Shapes and Sub Sections Formulas**

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