

Important Formulas of Ellipse PDF



Formulas Examples with Units

List of 24 Important Formulas of Ellipse

1) Area of Ellipse Formulas

1.1) Area of Ellipse Formula

Formula

$$A = \pi \cdot a \cdot b$$

Example with Units

$$188.4956 \text{ m}^2 = 3.1416 \cdot 10 \text{ m} \cdot 6 \text{ m}$$

Evaluate Formula 

1.2) Area of Ellipse given Linear Eccentricity and Semi Major Axis Formula

Formula

$$A = \pi \cdot a \cdot \sqrt{a^2 - c^2}$$

Example with Units

$$188.4956 \text{ m}^2 = 3.1416 \cdot 10 \text{ m} \cdot \sqrt{10 \text{ m}^2 - 8 \text{ m}^2}$$

Evaluate Formula 

1.3) Area of Ellipse given Major and Minor Axes Formula

Formula

$$A = \left(\frac{\pi}{4}\right) \cdot 2a \cdot 2b$$

Example with Units

$$188.4956 \text{ m}^2 = \left(\frac{3.1416}{4}\right) \cdot 20 \text{ m} \cdot 12 \text{ m}$$

Evaluate Formula 

2) Eccentricity and Linear Eccentricity of Ellipse Formulas

2.1) Eccentricity of Ellipse Formula

Formula

$$e = \sqrt{1 - \left(\frac{b}{a}\right)^2}$$

Example with Units

$$0.8 \text{ m} = \sqrt{1 - \left(\frac{6 \text{ m}}{10 \text{ m}}\right)^2}$$

Evaluate Formula 

2.2) Eccentricity of Ellipse given Linear Eccentricity and Semi Major Axis Formula

Formula

$$e = \frac{c}{a}$$

Example with Units

$$0.8 \text{ m} = \frac{8 \text{ m}}{10 \text{ m}}$$

Evaluate Formula 



2.3) Eccentricity of Ellipse given Linear Eccentricity and Semi Minor Axis Formula

Formula

$$e = \frac{c}{\sqrt{b^2 + c^2}}$$

Example with Units

$$0.8\text{ m} = \frac{8\text{ m}}{\sqrt{6\text{ m}^2 + 8\text{ m}^2}}$$

Evaluate Formula 

2.4) Linear Eccentricity of Ellipse Formula

Formula

$$c = \sqrt{a^2 - b^2}$$

Example with Units

$$8\text{ m} = \sqrt{10\text{ m}^2 - 6\text{ m}^2}$$

Evaluate Formula 

3) Latus Rectum of Ellipse Formulas

3.1) Latus Rectum of Ellipse Formula

Formula

$$2l = 2 \cdot \frac{b^2}{a}$$

Example with Units

$$7.2\text{ m} = 2 \cdot \frac{6\text{ m}^2}{10\text{ m}}$$

Evaluate Formula 

3.2) Latus Rectum of Ellipse given Eccentricity and Semi Minor Axis Formula

Formula

$$2l = 2 \cdot b \cdot \sqrt{1 - e^2}$$

Example with Units

$$7.2\text{ m} = 2 \cdot 6\text{ m} \cdot \sqrt{1 - 0.8\text{ m}^2}$$

Evaluate Formula 

3.3) Latus Rectum of Ellipse given Linear Eccentricity and Semi Minor Axis Formula

Formula

$$2l = 2 \cdot \frac{b^2}{\sqrt{c^2 + b^2}}$$

Example with Units

$$7.2\text{ m} = 2 \cdot \frac{6\text{ m}^2}{\sqrt{8\text{ m}^2 + 6\text{ m}^2}}$$

Evaluate Formula 

3.4) Latus Rectum of Ellipse given Major and Minor Axes Formula

Formula

$$2l = \frac{(2b)^2}{2a}$$

Example with Units

$$7.2\text{ m} = \frac{(12\text{ m})^2}{20\text{ m}}$$

Evaluate Formula 

3.5) Semi Latus Rectum of Ellipse Formula

Formula

$$l = \frac{b^2}{a}$$

Example with Units

$$3.6\text{ m} = \frac{6\text{ m}^2}{10\text{ m}}$$

Evaluate Formula 



4) Major Axis of Ellipse Formulas

4.1) Major Axis of Ellipse Formula

Formula

$$2a = 2 \cdot a$$

Example with Units

$$20_{\text{m}} = 2 \cdot 10_{\text{m}}$$

Evaluate Formula 

4.2) Semi Major Axis of Ellipse given Eccentricity and Linear Eccentricity Formula

Formula

$$a = \frac{c}{e}$$

Example with Units

$$10_{\text{m}} = \frac{8_{\text{m}}}{0.8_{\text{m}}}$$

Evaluate Formula 

4.3) Semi Major Axis of Ellipse given Eccentricity and Semi Minor Axis Formula

Formula

$$a = \frac{b}{\sqrt{1 - e^2}}$$

Example with Units

$$10_{\text{m}} = \frac{6_{\text{m}}}{\sqrt{1 - 0.8_{\text{m}}^2}}$$

Evaluate Formula 

4.4) Semi Major Axis of Ellipse given Linear Eccentricity and Semi Minor Axis Formula

Formula

$$a = \sqrt{b^2 + c^2}$$

Example with Units

$$10_{\text{m}} = \sqrt{6_{\text{m}}^2 + 8_{\text{m}}^2}$$

Evaluate Formula 

5) Minor Axis of Ellipse Formulas

5.1) Minor Axis of Ellipse Formula

Formula

$$2b = 2 \cdot b$$

Example with Units

$$12_{\text{m}} = 2 \cdot 6_{\text{m}}$$

Evaluate Formula 

5.2) Semi Minor Axis of Ellipse given Eccentricity and Linear Eccentricity Formula

Formula

$$b = \frac{c \cdot \sqrt{1 - e^2}}{e}$$

Example with Units

$$6_{\text{m}} = \frac{8_{\text{m}} \cdot \sqrt{1 - 0.8_{\text{m}}^2}}{0.8_{\text{m}}}$$

Evaluate Formula 

5.3) Semi Minor Axis of Ellipse given Eccentricity and Semi Major Axis Formula

Formula

$$b = a \cdot \sqrt{1 - e^2}$$

Example with Units

$$6_{\text{m}} = 10_{\text{m}} \cdot \sqrt{1 - 0.8_{\text{m}}^2}$$

Evaluate Formula 



5.4) Semi Minor Axis of Ellipse given Linear Eccentricity and Semi Major Axis Formula

Formula

$$b = \sqrt{a^2 - c^2}$$

Example with Units

$$6_m = \sqrt{10_m^2 - 8_m^2}$$

Evaluate Formula 

6) Other Formulas of Ellipse Formulas

6.1) Flattening of Ellipse Formula

Formula

$$f = \frac{2a - 2b}{2b}$$

Example with Units

$$0.6667_m = \frac{20_m - 12_m}{12_m}$$

Evaluate Formula 

6.2) Focal Parameter of Ellipse Formula

Formula

$$p = \frac{b^2}{c}$$

Example with Units

$$4.5_m = \frac{6_m^2}{8_m}$$

Evaluate Formula 

7) Radius of Ellipse Formulas

7.1) Circumradius of Ellipse Formula

Formula

$$r_c = \frac{2a}{2}$$

Example with Units

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

Evaluate Formula 

7.2) Inradius of Ellipse Formula

Formula

$$r_i = \frac{2b}{2}$$

Example with Units

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

Evaluate Formula 



Variables used in list of Important Formulas of Ellipse above

- **2a** Major Axis of Ellipse (Meter)
- **2b** Minor Axis of Ellipse (Meter)
- **2l** Latus Rectum of Ellipse (Meter)
- **a** Semi Major Axis of Ellipse (Meter)
- **A** Area of Ellipse (Square Meter)
- **b** Semi Minor Axis of Ellipse (Meter)
- **c** Linear Eccentricity of Ellipse (Meter)
- **e** Eccentricity of Ellipse (Meter)
- **f** Flattening of Ellipse (Meter)
- **l** Semi Latus Rectum of Ellipse (Meter)
- **p** Focal Parameter of Ellipse (Meter)
- **r_c** Circumradius of Ellipse (Meter)
- **r_i** Inradius of Ellipse (Meter)

Constants, Functions, Measurements used in list of Important Formulas of Ellipse above

- **constant(s):** π ,
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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