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Important Formulas of Hyperbola

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List of 21 Important Formulas of Hyperbola

Important Formulas of Hyperbola

Axis of Hyperbola

1) Conjugate Axis of Hyperbola

$$\text{fx } 2b = 2 \cdot b$$

[Open Calculator !\[\]\(de95854c7ee024cfadc48187bbb781b2_img.jpg\)](#)

$$\text{ex } 24\text{m} = 2 \cdot 12\text{m}$$

2) Semi Conjugate Axis of Hyperbola given Eccentricity

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

[Open Calculator !\[\]\(6a9b39b98eb945faa14c645ec99e4eaa_img.jpg\)](#)

$$\text{ex } 14.14214\text{m} = 5\text{m} \cdot \sqrt{(3\text{m})^2 - 1}$$

3) Semi Conjugate Axis of Hyperbola given Latus Rectum

$$\text{fx } b = \sqrt{\frac{L \cdot a}{2}}$$

[Open Calculator !\[\]\(f1c5da15572e3e09d343161be98f508d_img.jpg\)](#)

$$\text{ex } 12.24745\text{m} = \sqrt{\frac{60\text{m} \cdot 5\text{m}}{2}}$$



4) Semi Transverse Axis of Hyperbola given Focal Parameter

$$\text{fx } a = \frac{b}{p} \cdot \sqrt{b^2 - p^2}$$

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

$$\text{ex } 5.231816m = \frac{12m}{11m} \cdot \sqrt{(12m)^2 - (11m)^2}$$

5) Semi Transverse Axis of Hyperbola given Linear Eccentricity

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

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

$$\text{ex } 5m = \sqrt{(13m)^2 - (12m)^2}$$

6) Transverse Axis of Hyperbola

$$\text{fx } 2a = 2 \cdot a$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

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



Eccentricity of Hyperbola

7) Eccentricity of Hyperbola

$$\text{fx } e = \sqrt{1 + \frac{b^2}{a^2}}$$

[Open Calculator !\[\]\(23d9fc146e83b5c3013cfa32c784f8d5_img.jpg\)](#)

$$\text{ex } 2.6m = \sqrt{1 + \frac{(12m)^2}{(5m)^2}}$$

8) Eccentricity of Hyperbola given Focal Parameter

$$\text{fx } e = \frac{b^2}{a \cdot p}$$

[Open Calculator !\[\]\(aa53ad6fea213b8b2226d3077e30533a_img.jpg\)](#)

$$\text{ex } 2.618182m = \frac{(12m)^2}{5m \cdot 11m}$$

9) Eccentricity of Hyperbola given Latus Rectum and Semi Conjugate Axis

$$\text{fx } e = \sqrt{1 + \frac{(L)^2}{(2 \cdot b)^2}}$$

[Open Calculator !\[\]\(626ce8ac21792b9405bfddfea8e0c96a_img.jpg\)](#)

$$\text{ex } 2.692582m = \sqrt{1 + \frac{(60m)^2}{(2 \cdot 12m)^2}}$$



10) Eccentricity of Hyperbola given Linear Eccentricity and Semi Transverse Axis

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

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

$$ex \quad 2.6m = \frac{13m}{5m}$$

Focal Parameter of Hyperbola

11) Focal Parameter of Hyperbola

$$fx \quad p = \frac{b^2}{\sqrt{a^2 + b^2}}$$

[Open Calculator !\[\]\(8bba887393ca45b761e5cb49e755e762_img.jpg\)](#)

$$ex \quad 11.07692m = \frac{(12m)^2}{\sqrt{(5m)^2 + (12m)^2}}$$

12) Focal Parameter of Hyperbola given Eccentricity and Semi Transverse Axis

$$fx \quad p = \frac{a}{e} \cdot (e^2 - 1)$$

[Open Calculator !\[\]\(0fb13ad0bfa3d86868cdd3883e5665b3_img.jpg\)](#)

$$ex \quad 13.33333m = \frac{5m}{3m} \cdot ((3m)^2 - 1)$$



13) Focal Parameter of Hyperbola given Latus Rectum and Semi Conjugate Axis

$$\text{fx } p = \frac{b^2}{\sqrt{\left(\frac{2 \cdot b^2}{L}\right)^2 + b^2}}$$

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

$$\text{ex } 11.14172m = \frac{(12m)^2}{\sqrt{\left(\frac{2 \cdot (12m)^2}{60m}\right)^2 + (12m)^2}}$$

14) Focal Parameter of Hyperbola given Linear Eccentricity and Semi Conjugate Axis

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

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

$$\text{ex } 11.07692m = \frac{(12m)^2}{13m}$$

Latus Rectum of Hyperbola

15) Latus Rectum of Hyperbola

$$\text{fx } L = 2 \cdot \frac{b^2}{a}$$

[Open Calculator !\[\]\(104fbf564e2e5a8fbd84f31656d114c7_img.jpg\)](#)

$$\text{ex } 57.6m = 2 \cdot \frac{(12m)^2}{5m}$$



16) Latus Rectum of Hyperbola given Eccentricity and Semi Transverse Axis

$$fx \quad L = 2 \cdot a \cdot (e^2 - 1)$$

[Open Calculator !\[\]\(9dfdaff1d86ba3c1f8353b4d1b61b8c5_img.jpg\)](#)

$$ex \quad 80m = 2 \cdot 5m \cdot ((3m)^2 - 1)$$

17) Latus Rectum of Hyperbola given Linear Eccentricity and Semi Conjugate Axis

$$fx \quad L = \sqrt{\frac{(2 \cdot b^2)^2}{c^2 - b^2}}$$

[Open Calculator !\[\]\(2b376d1a92330ab09dad2665d2f89bf5_img.jpg\)](#)

$$ex \quad 57.6m = \sqrt{\frac{(2 \cdot (12m)^2)^2}{(13m)^2 - (12m)^2}}$$

18) Semi Latus Rectum of Hyperbola

$$fx \quad L_{Semi} = \frac{b^2}{a}$$

[Open Calculator !\[\]\(c444627dab9fee9a1550c053ffaaaae2_img.jpg\)](#)

$$ex \quad 28.8m = \frac{(12m)^2}{5m}$$



Linear Eccentricity of Hyperbola

19) Linear Eccentricity of Hyperbola

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

[Open Calculator !\[\]\(96cc62f861fdd6e50510c0224a756dff_img.jpg\)](#)

$$\text{ex } 13\text{m} = \sqrt{(5\text{m})^2 + (12\text{m})^2}$$

20) Linear Eccentricity of Hyperbola given Eccentricity and Semi Conjugate Axis

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

[Open Calculator !\[\]\(f95dab70c751fda7d824b8b03650f7aa_img.jpg\)](#)

$$\text{ex } 12.72792\text{m} = \sqrt{\frac{(12\text{m})^2}{1 - \frac{1}{(3\text{m})^2}}}$$

21) Linear Eccentricity of Hyperbola given Latus Rectum and Semi Transverse Axis

$$\text{fx } c = \sqrt{1 + \frac{L}{2 \cdot a}} \cdot a$$

[Open Calculator !\[\]\(e9474ce1d70442456f8fe9c393ea149c_img.jpg\)](#)

$$\text{ex } 13.22876\text{m} = \sqrt{1 + \frac{60\text{m}}{2 \cdot 5\text{m}}} \cdot 5\text{m}$$




Variables Used

- **2a** Transverse Axis of Hyperbola (*Meter*)
- **2b** Conjugate Axis of Hyperbola (*Meter*)
- **a** Semi Transverse Axis of Hyperbola (*Meter*)
- **b** Semi Conjugate Axis of Hyperbola (*Meter*)
- **c** Linear Eccentricity of Hyperbola (*Meter*)
- **e** Eccentricity of Hyperbola (*Meter*)
- **L** Latus Rectum of Hyperbola (*Meter*)
- **L_{Semi}** Semi Latus Rectum of Hyperbola (*Meter*)
- **p** Focal Parameter of Hyperbola (*Meter*)



Constants, Functions, Measurements used














- **Function:** **sqrt**, sqrt(Number)
Square root function
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion 



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- **Regular Polygon Formulas** 
- **Reuleaux Triangle Formulas** 
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- **Right Trapezoid Formulas** 
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