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| --- | --- | --- | --- | --- |
|  | Circle | Parabola | Ellipse | Hyperbola |
| Graph | C:\Users\joren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\N1B5Z7IZ\995px-Cartesian-coordinate-system-with-circle.svg[1].png | C:\Users\joren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\0BGVE7XY\30e589964d41228110a7030944e8f706[1].jpgC:\Users\joren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\0BGVE7XY\180px-Horizontal_Parabola[1].jpg |  | Horizontal Vertical Transverse axis determines orientation.C:\Users\joren\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\9J8LZNX2\CNX_Precalc_Figure_10_02_005n[1].jpg |
| Equations | $$x^{2}+y^{2}=r^{2}$$$$\left(x-h\right)^{2}+\left(y-k\right)^{2}=r^{2}$$2 squared terms,same coefficients,same signs | Vertical: $y=ax^{2}$ $y=a\left(x-h\right)^{2}+k$Horizontal: $x=ay^{2}$ $x=a\left(y-k\right)^{2}+h$1 squared term | Horizontal:$$\frac{(x-h)^{2}}{a^{2}}+\frac{(y-k)^{2}}{b^{2}}=1$$Vertical:$$\frac{(x-h)^{2}}{b^{2}}+\frac{(y-k)^{2}}{a^{2}}=1$$Two squared terms, different coefficients, same signs. | Horizontal:$$\frac{(x-h)^{2}}{a^{2}}-\frac{(y-k)^{2}}{b^{2}}=1$$Asymptote: $(y-k)=\pm \frac{b}{a}(x-h)$Vertical:$$\frac{(y-k)^{2}}{a^{2}}-\frac{(x-h)^{2}}{b^{2}}=1$$Asymptote: $(y-k)=\pm \frac{a}{b}(x-h)$Two squared terms, any coefficient, different signs  |
| Properties | Center (h,k) Radius= r | Vertex (h,k)$$p=\frac{1}{4a}$$F: (h, k + $\frac{1}{4a}$), (h + $\frac{1}{4a}, k)$D: y = k -$ \frac{1}{4a}$ , x = h- $\frac{1}{4a}$ $FC:\left|\frac{1}{a}\right|$Focus Vertex PDirectrix Vertex  | a$ > b$ (Tells direction)a = middle to vertex 2a = major axisb = middle to co-vertex2b = minor axisc = middle to focusa2- b2= c2c < a  | No restriction on a and b a = middle to vertex on transverse axis b = middle to other side of “box” on conjugate axisc = middle to focusa2+ b2= c2a < c |

 Complete the square to put standard form into center/vertex form.