Trigonometry/Precalculus

§9.2b Ellipses

Name _____

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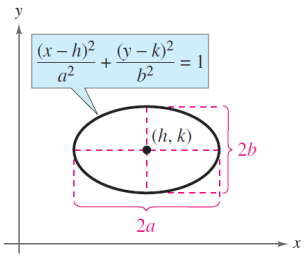
Standard Equation of an Ellipse

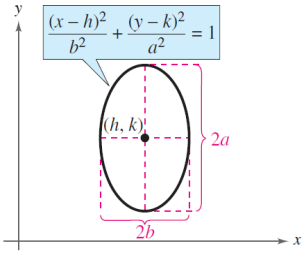
The **standard form of the equation of an ellipse** with center (h, k) and major and minor axes of lengths $2a$ and $2b$, respectively, where $0 < b < a$, is

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1 \qquad \text{(major axis is horizontal)}$$

$$\frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1. \qquad \text{(major axis is vertical)}$$

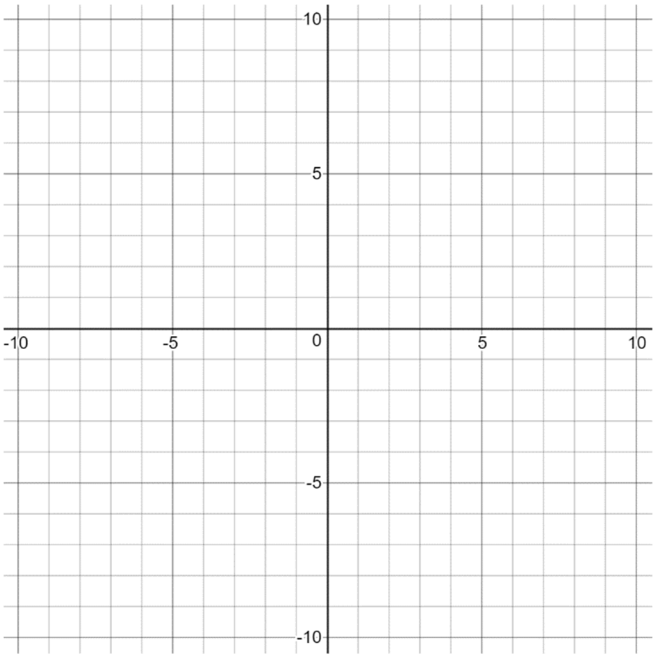
The foci lie on the major axis, c units from the center, with $c^2 = a^2 - b^2$.





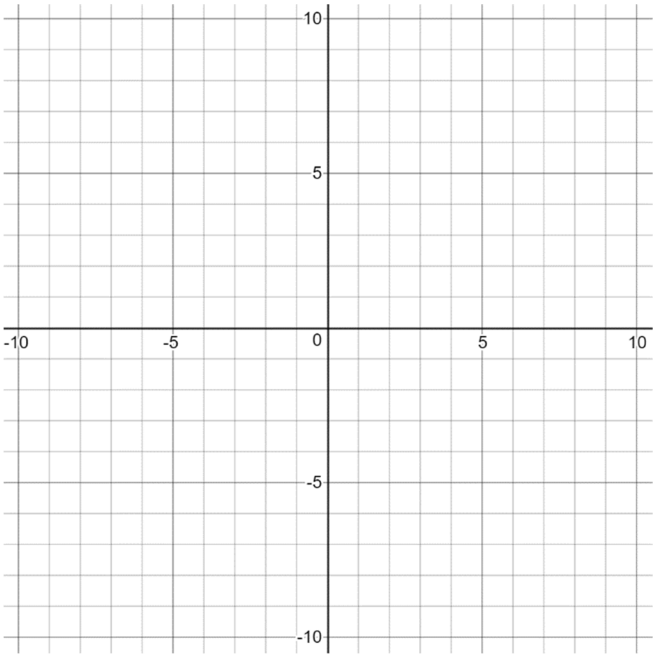
Example 1

Rewrite the equation of the ellipse $4x^2 + y^2 = 36$ in standard form. Sketch its graph, and identify the center, vertices, and foci.



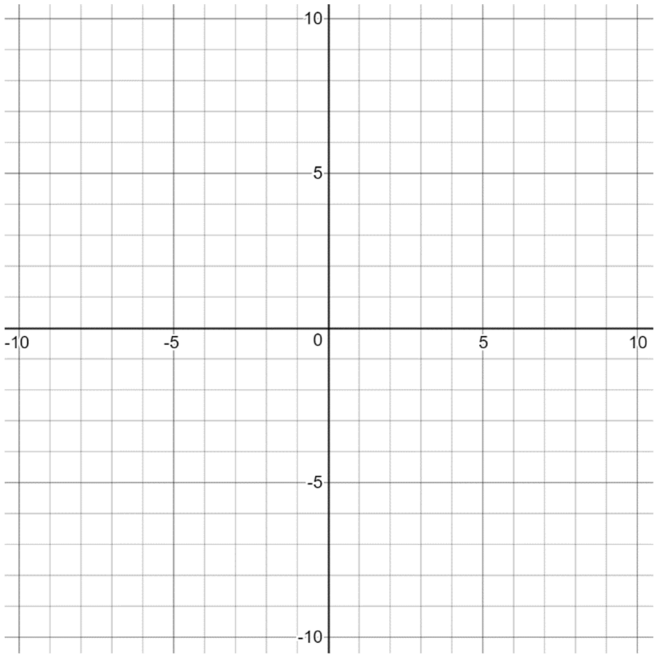
Example 2

Rewrite the equation of the ellipse $x^2 + 4y^2 + 6x - 8y + 9 = 0$ in standard form. Sketch its graph, and identify the center, vertices, and foci.



Example 3

Rewrite the equation of the ellipse $4x^2 + y^2 - 8x + 4y - 8 = 0$ in standard form. Sketch its graph, and identify the center, vertices, and foci.



Trigonometry/Precalculus

§9.2b Ellipses HOMEWORK

Name _____

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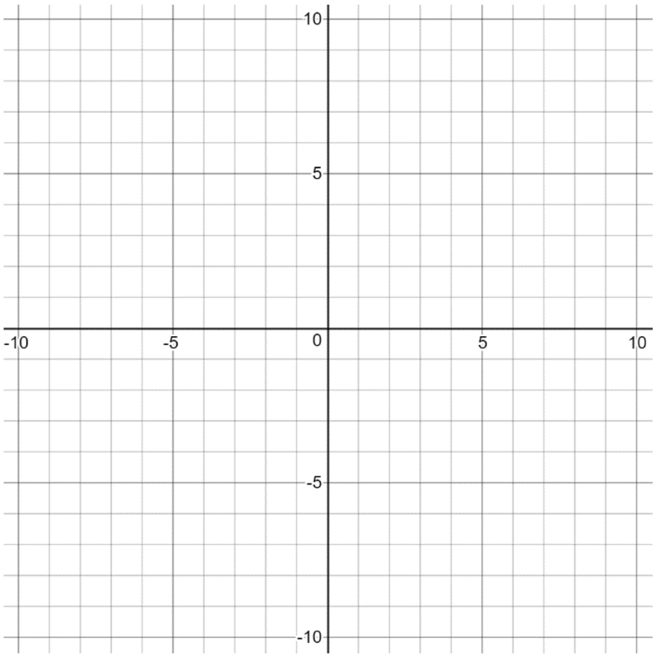
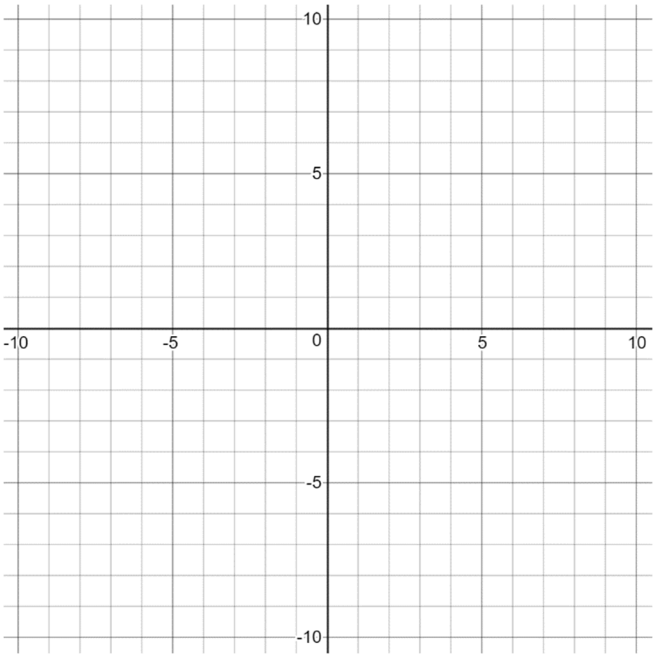
In Exercises 1-4, rewrite the equation of the ellipse. Sketch its graph, and identify the center, vertices, and foci.

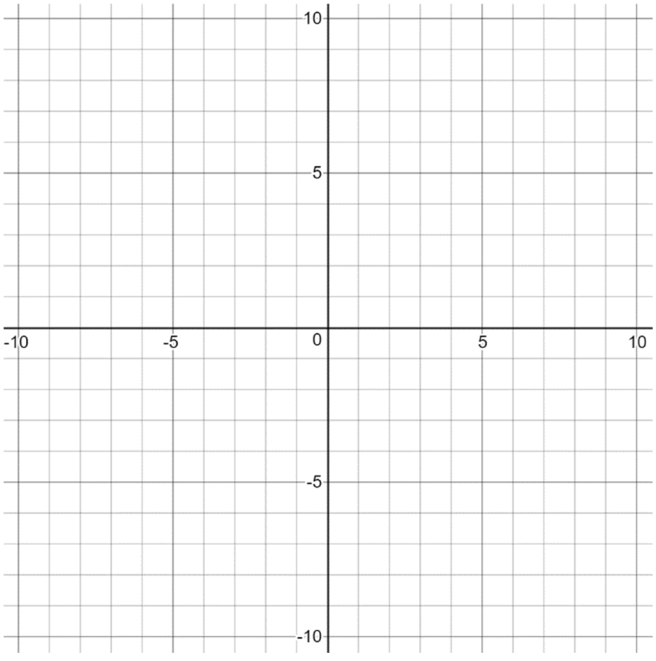
1. $x^2 + 9y^2 = 36$



2. $9x^2 + 4y^2 + 36x - 24y + 36 = 0$



3. $9x^2 + 25y^2 - 36x - 50y + 60 = 0$



4. $36x^2 + 4y^2 - 36x + 8y - 23 = 0$