



9-3 Additional Practice

Ellipses

Write an equation of an ellipse for the given foci and sum of the distances from the foci to any point on an ellipse.

1. foci $(\pm 5, 0)$

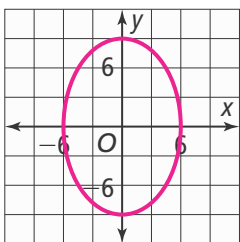
Sum of the distances: 12 $\frac{x^2}{36} + \frac{y^2}{11} = 1$

2. foci $(0, \pm 2)$

Sum of the distances: 6 $\frac{x^2}{5} + \frac{y^2}{9} = 1$

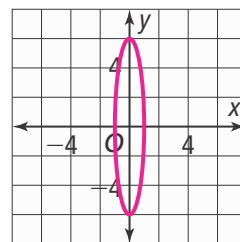
Graph the ellipses represented by each equation. Then find the coordinates of the foci.

3. $\frac{x^2}{36} + \frac{y^2}{81} = 1$



foci: $(0, 3\sqrt{5})$ and $(0, -3\sqrt{5})$

4. $x^2 + \frac{y^2}{36} = 1$



foci: $(0, \sqrt{35})$ and $(0, -\sqrt{35})$

5. What is the equation of an ellipse centered at the origin that has a horizontal axis 18 units long and a vertical axis 24 units long? $\frac{x^2}{81} + \frac{y^2}{144} = 1$

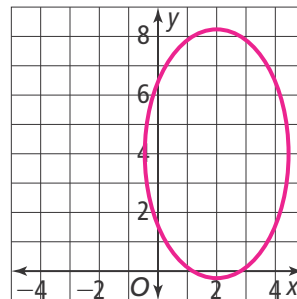
6. Graph the ellipse represented by
- $3x^2 - 12x + y^2 - 8y + 10 = 0$
- . Label the coordinates of the center, vertices, co-vertices, and foci. Round to the nearest thousandth.

Center: $(2, 4)$

Vertices: $(2, 8.243)$ and $(2, -0.243)$

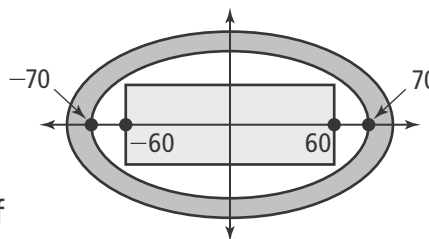
Co-vertices: $(-0.449, 4)$ and $(4.449, 4)$

Foci: $(2, 7.464)$ and $(2, 0.536)$



7. A track goes around a football field. The inner part of the track is 140 yd on its longest axis. The goal posts, representing the foci, are 120 yd apart. The starting lines are located on the co-vertices of the inner track. Find the equation of the ellipse representing the inner track. How far are the starting lines from the center of the field?

$$\frac{x^2}{4900} + \frac{y^2}{1300} = 1; 10\sqrt{13} \text{ or } 36.06 \text{ yd}$$



8. A student examines an ellipse with foci of
- $(43, 0)$
- and
- $(-43, 0)$
- and with vertices of
- $(45, 0)$
- and
- $(-45, 0)$
- . He claims that the ellipse has co-vertices of
- $(0, 44)$
- and
- $(0, -44)$
- . Is the student correct? Explain.
- No; $a^2 = b^2 + c^2$, so $45^2 = b^2 + 43^2$ and $b = 4\sqrt{11} \approx 13.267$, so the co-vertices are $(0, 13.267)$ and $(0, -13.267)$.**