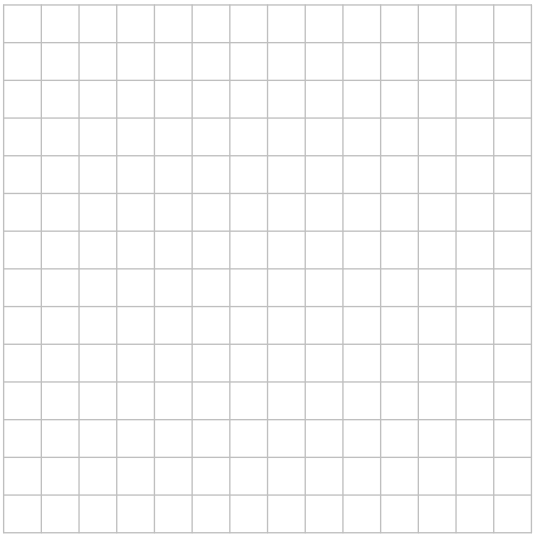
Advanced ellipses and hyperbolas

Review: solve the problem using a system of equations.

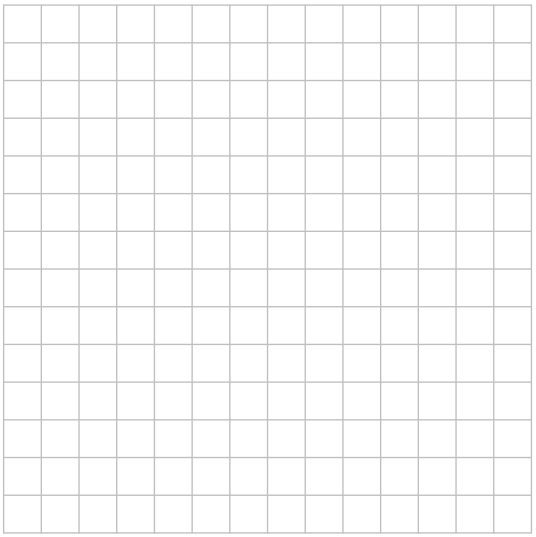
1. Say that Painter A can paint a room in 8 hours. Painter B can paint the same room in 6 hours. How long will it take to paint the room if the two painters work together?

Put each equation in standard form and determine the center. If the equation describes an ellipse, find the vertices, co-vertices and foci. If the equation describes a hyperbola, find the vertices, foci and asymptotes. Then draw the graph.

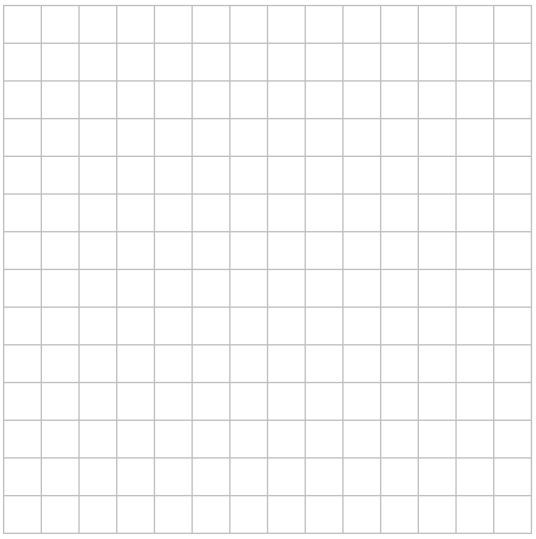
2. $9x^2 + 4y^2 + 54x - 8y + 49 = 0$



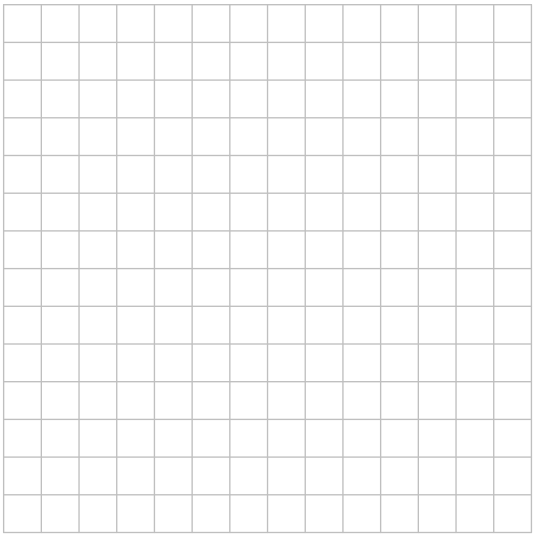
3. $4y^2 - x^2 + 8y - 4x - 4 = 0$



4. $x^2 - 8x + 2 = y^2 - 2y + 3$



5. $x^2 + 4y^2 - 2x + 24y + 21 = 0$



ANSWERS

1. 3.4 hours
2. An ellipse with center: $(-3, 1)$, vertices: $(-3, -2)$ and $(-3, 4)$, covertices $(-5, 1)$ and $(-1, 1)$, foci: $(-3, -1.24)$ and $(-3, 3.24)$
3. A hyperbola with center: $(-2, -1)$, vertices: $(-2, -3)$ and $(-2, 1)$, foci: $(-2, -3.36)$ and $(-2, 1.36)$, asymptotes: $y = \frac{1}{2}x$ and $y = -\frac{1}{2}x - 2$
4. A hyperbola with center: $(4, -1)$, vertices: $(0, -1)$ and $(8, -1)$, foci: $(-1.66, -1)$ and $(9.66, -1)$, asymptotes: $y = x - 5$ and $y = -x + 3$
5. An ellipse with center: $(1, -3)$, vertices: $(-3, -3)$ and $(5, -3)$, covertices $(1, -5)$ and $(1, -1)$, foci: $(-2.46, -3)$ and $(4.46, -3)$