Chapter 9 Review

Find the distance between the two points. Then find the midpoint between the two points.
1. (-10, 12) and (4, -8)
2. (0, 10) and (15, 3)

Graph the equation.
3. $x^2 = -4y$
4. $x^2 + y^2 = 9$
5. $10x^2 + 10y^2 = 250$
6. $\frac{x^2}{4} + \frac{y^2}{25} = 1$
7. $x^2 + 4y^2 = 16$
8. $x^2 - \frac{y^2}{4} = 1$

Write the standard form of the equation of the conic section with the given characteristics.
9. Parabola with vertex at (0, 0) and focus at (0, 5).
10. Parabola with vertex at (0, 0) and directrix at $y = 2$.
11. Circle with center at (0, 0) and passes through (7, 24).
12. Ellipse with the center at (0, 0) and vertex at (2, 0) and co-vertex at (1, 0).
13. Ellipse with the center at (0, 0) and vertex at (5, 0) and the focus at (-3, 0).
14. Hyperbola with the center at (0, 0) and foci at (±10, 0) and vertices at (±6, 0).

Classify the conic section.
15. $4x^2 + 9y^2 - 2x + 10y - 20 = 0$
16. $9x^2 - 3xy + 4y^2 - 3x + 7y - 45 = 0$

Solve the system of equations.
17. \[
\begin{cases}
    x^2 + y^2 = 16 \\
    x = 2y
\end{cases}
\]
18. \[
\begin{cases}
    x^2 + 3x - 6y = 0 \\
    2x + y - 1 = 0
\end{cases}
\]
19. \[
\begin{cases}
    3x^2 - 4y^2 - 48 = 0 \\
    x^2 + y^2 = 16
\end{cases}
\]
20. \[
\begin{cases}
    x^2 = 4y \\
    x^2 = 20
\end{cases}
\]
21. A certain amphitheater is shaped like an ellipse. If the equation of the ellipse is $\frac{x^2}{2500} + \frac{y^2}{2025} = 1$. The speaker should stand at one focus and the listener should sit at the other focus to get the best sound. Where are the locations of the foci?
1. \( d = 2\sqrt{149}; \text{Midpt} = (-3, 2) \)

2. \( d = \sqrt{274}; \text{Midpt} = \left(\frac{15}{2}, \frac{7}{2}\right) \)

3. 

4. 

5. 

6. 

7. 

8. 

9. \( x^2 = 20y \)

10. \( x^2 = -4y \)

11. \( x^2 + y^2 = 625 \)

12. \( \frac{x^2}{4} + y^2 = 1 \)

13. \( \frac{x^2}{25} + \frac{y^2}{16} = 1 \)

14. \( \frac{x^2}{36} - \frac{y^2}{64} = 1 \)

15. Ellipse

16. Ellipse

17. \( \left(\frac{8\sqrt{5}}{5}, \frac{4\sqrt{5}}{5}\right), \left(-\frac{8\sqrt{5}}{5}, -\frac{4\sqrt{5}}{5}\right) \)

18. \((0.390, 0.220), (-15.390, 31.780)\)

19. \((-4, 0), (4, 0)\)

20. \((-2\sqrt{5}, 5), (2\sqrt{5}, 5)\)

21. \((-5\sqrt{19}, 0), (5\sqrt{19}, 0)\)