Conics Unit Test

Vocabulary

For 1-4 fill in the blank with the word that best completes the sentence. Use the provided word bank for suggestions. (2 points each)

1. All points on a circle are equidistant from a given point known as the ____________________.

2. A ___________ is the set of all points in a plane such that the absolute value of the difference from two fixed points is constant.

3. The ________________ axis is the longer of the two axes of symmetry of an ellipse.

4. The directrix is associated with what conic section? _________________

<table>
<thead>
<tr>
<th>Circle</th>
<th>Parabola</th>
<th>Center</th>
<th>Focus</th>
<th>Major</th>
<th>Hyperbola</th>
</tr>
</thead>
</table>

5. Find the distance between (3, 7) and (-1, 4). (5 points)

6. Consider the following parabolas. Using only conclusions drawn from these graphs, describe how the distance between the focus and the vertex affects the shape of the parabola. Write your answer on the back of this sheet. (4 points)
7. Graph the parabola with the following equation: \((x - 4)^2 = (y - 4)\). Label the vertex and the focus. (5 points)

8. Describe how conic sections are formed. (3 points)
9. Write an equation for the ellipse with intercepts (0, -4), (0, 4), (-3, 0), and (3, 0). (3 points)

For 10-13 match the equations in column I with the appropriate descriptions in column II. (2 points each)

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. ______  ((y - 7)^2 = (x + 24))</td>
<td>A. Line with slope (-\frac{3}{5})</td>
</tr>
<tr>
<td>11. ______  (\frac{x^2}{25} + \frac{y^2}{9} = 1)</td>
<td>B. Circle with radius 7</td>
</tr>
<tr>
<td>12. ______  (y = -\frac{3}{5}x + 6)</td>
<td>C. Ellipse with (x)-intercepts ((\pm 5, 0))</td>
</tr>
<tr>
<td>13. ______  (x^2 + y^2 = 49)</td>
<td>D. Parabola with vertex ((-24, 7))</td>
</tr>
</tbody>
</table>

14. Consider the following diagram.

What conclusions can you make about ellipses or circles based on this diagram? (3 points)
15. Consider the equation \( \frac{y^2}{16} - \frac{x^2}{4} = 1 \). What conic section is this? Answer this question and graph the equation. Label vertices and asymptotes. (4 points)

For 16-18 choose the conic that best models the given scenario. (2 points each)

16. ______ Flight of a baseball
   A. Parabola   B. Circle   C. Ellipse   D. Hyperbola

17. ______ Earth’s orbit around the sun
   A. Parabola   B. Circle   C. Ellipse   D. Hyperbola

18. ______ Set of all locations 10 miles from your house
   A. Parabola   B. Circle   C. Ellipse   D. Hyperbola
19. Suppose you are given the following system of inequalities: 
\[ x + 2y > 1 \text{ and } x^2 + y^2 \leq 25. \] Use a bulleted list to describe how you would solve this system. You do **not** have to actually do this. (3 points)

20. Given \((x - 3)^2 + y^2 = 16\), name the center and the radius. (2 points)

21. Use what we learned about parabolas to describe how light is emitted by a flashlight. (3 points)