Name: ____________________________

Quadratic Formula Quiz

Solve for the roots by factoring the quadratic equation.

1. \( x^2 - x - 6 \)

2. \( x^2 + 6x + 8 \)

3. \( x^2 - 7x - 8 \)

4. \( x^2 + 7x - 44 \)

5. \( x^2 - 17x + 72 \)

6. \( x^2 + 5x + 4 \)

Solve for the roots using the quadratic equation. \( \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \)

7. \( 4x^2 + 4x + 1 = 0 \)

8. \( 5y^2 - 8y + 1 = 0 \)

9. \( 2x^2 - 3x - 5 = 0 \)
10. $x^2 - 12x - 28$

11. $x^2 - 4x - 5$

Determine the nature of the roots of the quadratic equation. Use: $b^2 - 4ac$

12. $x^2 - 8x + 16 = 0$

13. $-2x^2 + 14x - 10 = 0$

Solve the equation to find the vertex. Use: $\frac{-b}{2a}$

14. $x^2 - 4x + 6$

15. $2x^2 + 7x - 1$
Name: 

Quadratic Formula Quiz

Solve for the roots by factoring the quadratic equation.
1. \( x^2 - x - 42 \)
2. \( x^2 + 16x - 80 \)
3. \( x^2 + 2x - 24 \)
4. \( x^2 + 7x - 44 \)
5. \( x^2 - 17x + 72 \)
6. \( x^2 + 3x - 40 \)

Solve for the roots using the quadratic equation. \( \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \)
7. \( 3y^2 - 2y - 2 = 0 \)
8. \( 5y^2 - 8y + 1 = 0 \)
9. \( 9x^2 - 24x + 16 = 0 \)
Complete the table.

<table>
<thead>
<tr>
<th>Quadratic Function</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of zeros</td>
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</table>
| Is the Discriminant $b^2 - 4ac = 0$, $< 0$, or $> 0$?

Without solving, determine the nature of the roots of each quadratic equation.

4. $3x^2 + 5x - 4 = 0$  
5. $x^2 + 6x + 9 = 0$
6. $2y^2 - 3y + 2 = 0$  
7. $z^2 + 8z - 6 = 0$
8. $-3x^2 + 2x + 7 = 0$  
9. $2x^2 - 5x + 4 = 0$

Find the number of $x$-intercepts of each function.

10. $y = 3x^2 + 5x - 2$  
11. $y = 3.7x^2 - 2.8x + 0.52$
12. $y = 3.7x^2 - 2.8x + 0.54$  
13. $y = 2.56x^2 - 8.64x + 7.29$
14. $f(x) = 5x^2 + 2x - 1$  
15. $F(x) = 7x^2 + 6x + 1$
16. Sketch the graph of a quadratic function that opens downward and whose discriminant is negative.
17. Sketch the graph of a quadratic function whose discriminant is positive and whose vertex is in the third quadrant.

Use the discriminant to see if the following has at least one real-number answer. If it does not, say so and explain how you can tell. If it does, find the solution.

18. A ball is tossed upward from a height of 1.5 m with an initial vertical velocity of 3 m/sec.

At what time(s) will the ball attain a height of 2 m?
Hyperbolas

Find the coordinates of the vertices and foci and the slopes of the asymptotes for each hyperbola whose equation is given. Then draw the graph.

1. \[ \frac{y^2}{9} - \frac{x^2}{36} = 1 \]

2. \[ y^2 - 4x^2 = 16 \]

3. \[ \frac{(y - 2)^2}{9} - \frac{(x + 3)^2}{25} = 1 \]

4. \[ \frac{(x - 1)^2}{64} - \frac{(y + 4)^2}{16} = 1 \]

5. \[ 4y^2 - x^2 - 16y + 2x + 11 = 0 \]

6. \[ 3y^2 - 4x^2 + 12y + 24x = 36 \]
Ellipses

Find the coordinates of the center and foci, and lengths of the major and minor axes for each ellipse whose equation is given. Then draw the graph.

1. \[ \frac{x^2}{9} + \frac{y^2}{16} = 1 \] (Center 0, 0)

2. \[ 16x^2 + y^2 = 64 \]

3. \[ \frac{(x - 3)^2}{1} + \frac{(y - 1)^2}{36} = 1 \]

4. \[ \frac{(x + 4)^2}{49} + \frac{(y + 3)^2}{25} = 1 \] (Center (-4, -3))

Write the equation for each ellipse described below.

5. The foci are at (4, 0) and (-4, 0). Then endpoints of the minor axis are at (0, 2) and (0, -2).

6. The center has coordinates (2, -4). The minor axis is parallel to the x-axis with a length of 6. The major axis has a length of 10.
Name:

Conic Sections Quiz

State whether the graph of each equation is a circle, ellipse, parabola, or a hyperbola. Determine the center and/or vertices of each.

1. \( \frac{x^2}{25} + \frac{y^2}{16} = 1 \)
2. \( x^2 + y^2 = 36 \)

3. \( y = (x - 5)^2 + 1 \)
4. \( \frac{x^2}{9} - y^2 = 1 \)

5. \( \frac{(x-3)^2}{4} + \frac{(y-4)^2}{9} = 1 \)

6. Write an equation of a circle with center at (4, -2) and radius of 5.

7. \( y = x^2 -10x + 8 \)

Extra Credit

Write an equation for an ellipse with vertices (-4, 0) and (4,0) and foci of (0,-3) and (0, 3).
State whether the graph of each equation is a circle, ellipse, parabola, or a hyperbola. Determine the center and/or vertices of each.

1. \( \frac{x^2}{16} + \frac{y^2}{49} = 1 \)  
2. \( y = (x - 3)^2 + 1 \)

3. \( x^2 + y^2 = 49 \)  
4. \( \frac{y^2}{36} - \frac{x^2}{25} = 1 \)

5. \( (x - 2)^2 + (y - 5)^2 = 4 \)  
6. \( 16x^2 - 9y^2 = 144 \)

7. \( 25x^2 + 9y^2 = 225 \)  
8. \( y = x^2 - 10x + 8 \)

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

10. Write an equation of a circle with center at \( (2, -3) \) and radius of 6.

11. Write an equation for an ellipse with vertices \( (-4, 0) \) and \( (4, 0) \) and foci of \( (-2, 0) \) and \( (2, 0) \).

12. Write an equation of a hyperbola with center at the origin and vertex at \( (0,3) \) and an asymptote with the equation of \( y = x \).
Direct, Inverse, and Joint Variation

Write an equation for each statement. Then solve the equation.

1. Find $y$ when $x = 6$, if $y$ varies directly as $x$ and $y = 8$ when $x = 2$.

2. Find $y$ when $x = 1.5$, if $y$ varies directly as $x$ and $y = -16$ when $x = 6$.

3. Find $y$ when $x = 4$, if $y$ varies directly as $x$ and $y = 7$ when $x = 1.5$.

4. Find $y$ when $x = 5$, if $y$ varies directly as $x$ and $y = 5$ when $x = 3.5$.

5. Find $x$ when $y = 3$, if $y$ varies inversely as $x$ and $x = 4$, when $y = 16$.

6. Find $x$ when $y = 5$, if $y$ varies inversely as $x$ and $x = 6$, when $y = -18$.

7. Find $y$ when $x = \frac{1}{2}$, if $y$ varies inversely as $x$ and $x = 5$ when $y = 3$.

8. Find $y$ when $x = 10$, if $y$ varies inversely as $x$ and $x = 7.5$ when $y = 6$.

9. Find $y$ when $x = 4$ and $z = 15$, if $y$ varies jointly as $x$ and $z$ and $y = 5$ when $z = 8$ and $x = 10$.

10. Find $y$ when $x = 12$ and $z = 2$, if $y$ varies jointly as $x$ and $z$ and $y = 24$ when $z = 2$ and $x = 1$.

11. Find $y$ when $x = 6$ and $z = 8$, if $y$ varies jointly as $x$ and $z$ and $y = 60$ when $x = 3$ and $z = 4$.

12. Find $y$ when $x = 4$ and $z = -1$, if $y$ varies jointly as $x$ and $z$ and $y = 12$ when $x = -2$ and $z = 3$. 