Classroom Voting Questions: Precalculus

Conic Sections

1. Find an equation of a parabola that has vertex at the origin, opens right, and passes through \((9, -2)\).
   
   (a) \( y = \frac{2}{81}x^2 \)
   
   (b) \( y = -\frac{2}{81}x^2 \)
   
   (c) \( x = \frac{9}{4}y^2 \)
   
   (d) \( x = -\frac{9}{4}y^2 \)

2. Find an equation of the parabola that has vertex \((2, 1)\) and directrix \(y = 6\).
   
   (a) \((x - 2)^2 = 20(y - 1)\)
   
   (b) \((x - 2)^2 = -20(y - 1)\)
   
   (c) \((y - 1)^2 = 20(x - 2)\)
   
   (d) \((y - 1)^2 = -20(x - 2)\)

3. Find the vertices and the endpoints of the minor axis for the ellipse given by the equation \(9x^2 + 4y^2 = 16\).
   
   (a) vertices: \((2, 0)\) and \((-2, 0)\); endpoints of minor axis: \((0, \frac{8}{3})\) and \((0, -\frac{8}{3})\)
   
   (b) vertices: \((0, 2)\) and \((0, -2)\); endpoints of minor axis: \((\frac{4}{3}, 0)\) and \((-\frac{4}{3}, 0)\)
   
   (c) vertices: \((2, 0)\) and \((-2, 0)\); endpoints of minor axis: \((0, \frac{3}{4})\) and \((0, -\frac{3}{4})\)
   
   (d) vertices: \((0, 2)\) and \((0, -2)\); endpoints of minor axis: \((\frac{3}{4}, 0)\) and \((-\frac{3}{4}, 0)\)

4. Find an equation for the ellipse that has vertices at \((0, 3)\) and \((0, -3)\) and foci at \((0, 2)\) and \((0, -2)\).
   
   (a) \( \frac{x^2}{4} + \frac{y^2}{9} = 1 \)
   
   (b) \( \frac{x^2}{9} + \frac{y^2}{4} = 1 \)
5. What is the equation of the ellipse graphed below?

\[ \frac{x^2}{5} + \frac{y^2}{9} = 1 \]  
\[ \frac{x^2}{9} + \frac{y^2}{5} = 1 \]

6. Find equations for the asymptotes of the hyperbola given by the equation \( y^2 - \frac{x^2}{2} = 4 \).

\[ y = \pm \frac{1}{\sqrt{2}}x \]  
\[ y = \pm \frac{1}{2}x \]  
\[ y = \pm \sqrt{2}x \]  
\[ y = \pm 2x \]
7. Find the center of the hyperbola given by the equation \( 4x^2 - 9y^2 + 16x + 18y = 29 \).

(a) (2, 1)  
(b) (2, -1)  
(c) (-2, 1)  
(d) (-2, -1)