

Math-algebra. Conic sections.

1. Identify the curves defined by the equations below. Then

- find their characteristic points and lines, such as center, vertex/vertices, focus/foci, asymptotes, directrix (of a parabola),
- sketch the graphs of the curves, clearly indicating your findings.

(a) $x^2 + 9y^2 + 2x - 8 = 0$.

(b) $16x^2 + y^2 - 32x + 6y + 21 = 0$.

(c) $3x^2 + 3y^2 - 4x + 5y - 1 = 0$.

(d) $x^2 - y^2 + 2x + 4y - 11 = 0$.

(e) $-2x^2 + y^2 + 8x - 2y - 13 = 0$.

(f) $-4x^2 + 4x - 2y + 1 = 0$.

(g) $y^2 - 6y + \frac{1}{2}x = 0$.

2. $F_1 = (-3, 2)$ and $F_2 = (5, 2)$ are foci of an ellipse. If its eccentricity is $e = \frac{4}{5}$ find the equation of this curve and sketch the graph.
3. The lines $y = \frac{1}{2}x - \frac{5}{2}$ and $y = -\frac{1}{2}x - \frac{3}{2}$ are asymptotes of a hyperbola. If one of its vertices is $A = (1, 0)$ find the equation of this curve and sketch the graph.
4. Find the equation of a parabola whose focus is $F = (5, 3)$ and the directrix is $x = 9$.

Krzysztof "El Profe" Michalik