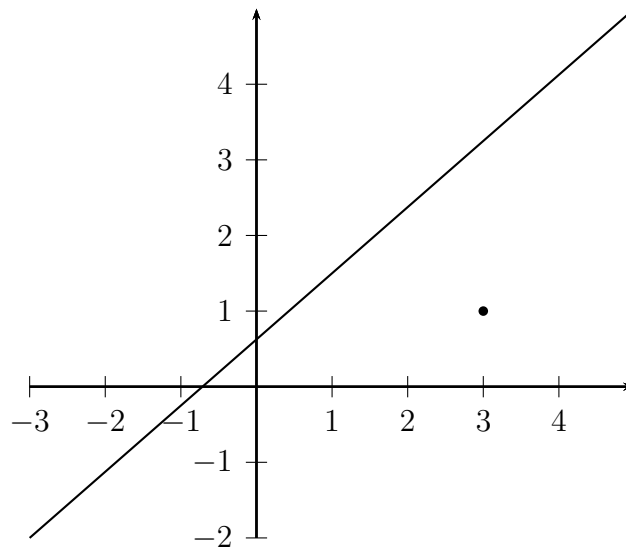# MATH 102 Calculus and Analytic Geometry II
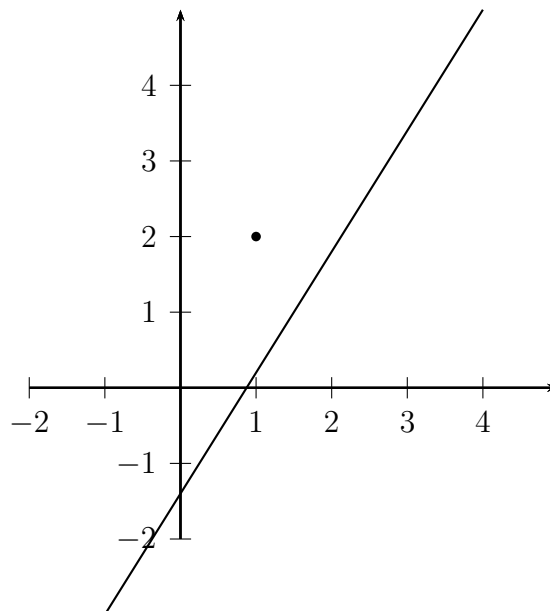# Fall 2018–2019 Exam 2 Postparation

Dr. Rafael Andrist

1. Sketch the parabola with the indicated directrix and focus. Indicate its axis and vertex in the sketch.

2. Sketch the parabola with the indicated directrix and vertex. Indicate its axis and focus in the sketch.

3. Consider the parabola with the directrix $x = y$ and focus $(3,0)$. Sketch the parabola and calculate the coordinates of its vertex. Give the equation of the line that coincides with the axis of the parabola.

4. Indicate center, axes, vertices and asymptotes of the following hyperbola. Recall the definition of a hyperbola in order to find the foci.
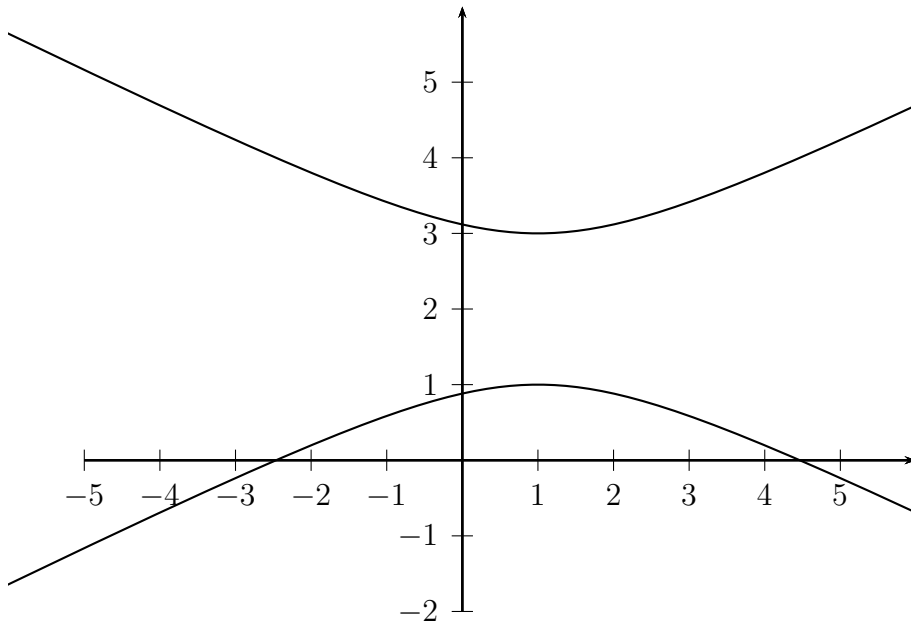
5. Let $(0,0)$ be a focus and $(2,2)$ a vertex of the hyperbola with an asymptote $y = -1$. Find the other focus, the other vertex, the other asymptote, and sketch the hyperbola.

6. Describe the trace of the curve $(0, \infty) \ni t \mapsto (e^{-t}\cos(t), e^{-t}\sin(t)) \in \mathbb{R}^2$ by an equation in the coordinates x and y.

7. Let $\vec{v} = (1, 2, 0)$ and $\vec{w} = (-4, 5, -1)$.

   (a) Calculate $\vec{u} = \vec{v} \times (\vec{v} \times \vec{w})$.

   (b) Calculate the lengths of $\vec{u}$, $\vec{v}$ and $\vec{v} \times \vec{w}$, what do you observe?

   (c) Describe geometrically the relation between $\vec{u}$ and the other vectors.

   (d) Is $\vec{v} \times (\vec{v} \times (\vec{v} \times \vec{w}))$ parallel to any of the vectors $\vec{u}$, $\vec{v}$ or $\vec{w}$?