MATH 2130 – Tutorial Problems, Thu Jan 25

Sketching surfaces

Example (review). In the xy-plane, sketch the hyperbola given by the equation

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1,$$

where $a, b > 0$. Include the intercepts of the hyperbola, and the equations of its asymptotes.

Example. Sketch the surface given by the equation $z = x^2 - 2y^2$.

Parametric representations of curves

Example. Find a parametric representation for the intersection of the surface $x^2 + (y+4)^2 + (z-2)^2 = 9$ with (a) the plane $z = 1$; (b) the plane $y + z = 2$.

Example. Find a parametric representation for the intersection of the surfaces

$$x = \sqrt{y^2 + z^2} \quad \text{and} \quad x - 3z = 0$$

such that x increases when y is negative.