Graphing Functions

In this activity, we introduce and classify quadric surfaces, which form an important family of surfaces.

Definition of a Quadric Surface

You might remember studying conic sections, such as parabolas, circles, ellipses, and hyperbolas. These are curves in the plane that arise through polynomial equations of degree two in two variables.

PICTURE

Quadric Surfaces are the three dimensional analogue of conic sections. That is, a quadric surface is the set of points in $\mathbb{R}^3$ satisfying some polynomial of degree two in three variables.

Definition 1. *A* quadric surface *is the set of points* (x, y, z) *in* $\mathbb{R}^3$ *satisfying the equation*

$$Ax^2 + Bxy + Cxz + Dy^2 + Eyz + Fz^2 + Gx + Hy + Iz + J = 0,$$

where $A, B, C, D, E, F, G, H, I, J \in \mathbb{R}$ *are constants.*

Conclusion

In this activity, we introduced and classified quadric surfaces, which form an important family of surfaces.

Learning outcomes:
Author(s):