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3. Review: Trying to draw a function of two variables

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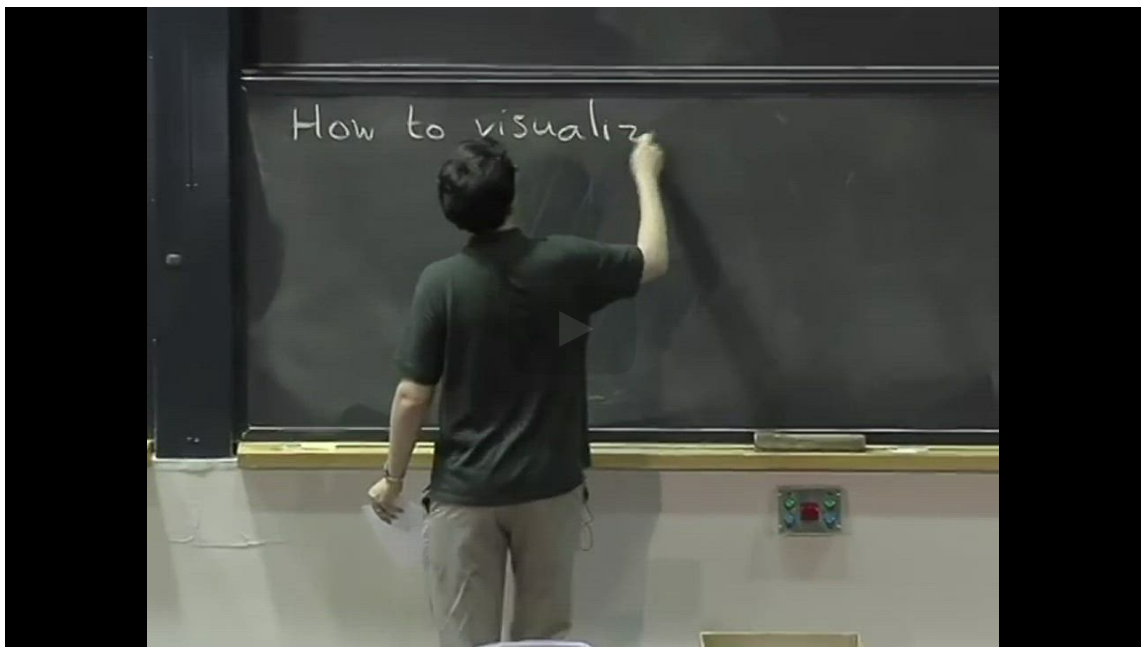
Review

The first video appears in the first lecture. It is here again as a review.

First example



Start of transcript. Skip to the end.

PROFESSOR: So the first thing we can do

is try to draw the graph of f.

So maybe I should say f, which is a function of two variables.

So the first answer will be we can try to look at its graph.

And the idea is the same as with one variable, namely,

we look at all the possible values of

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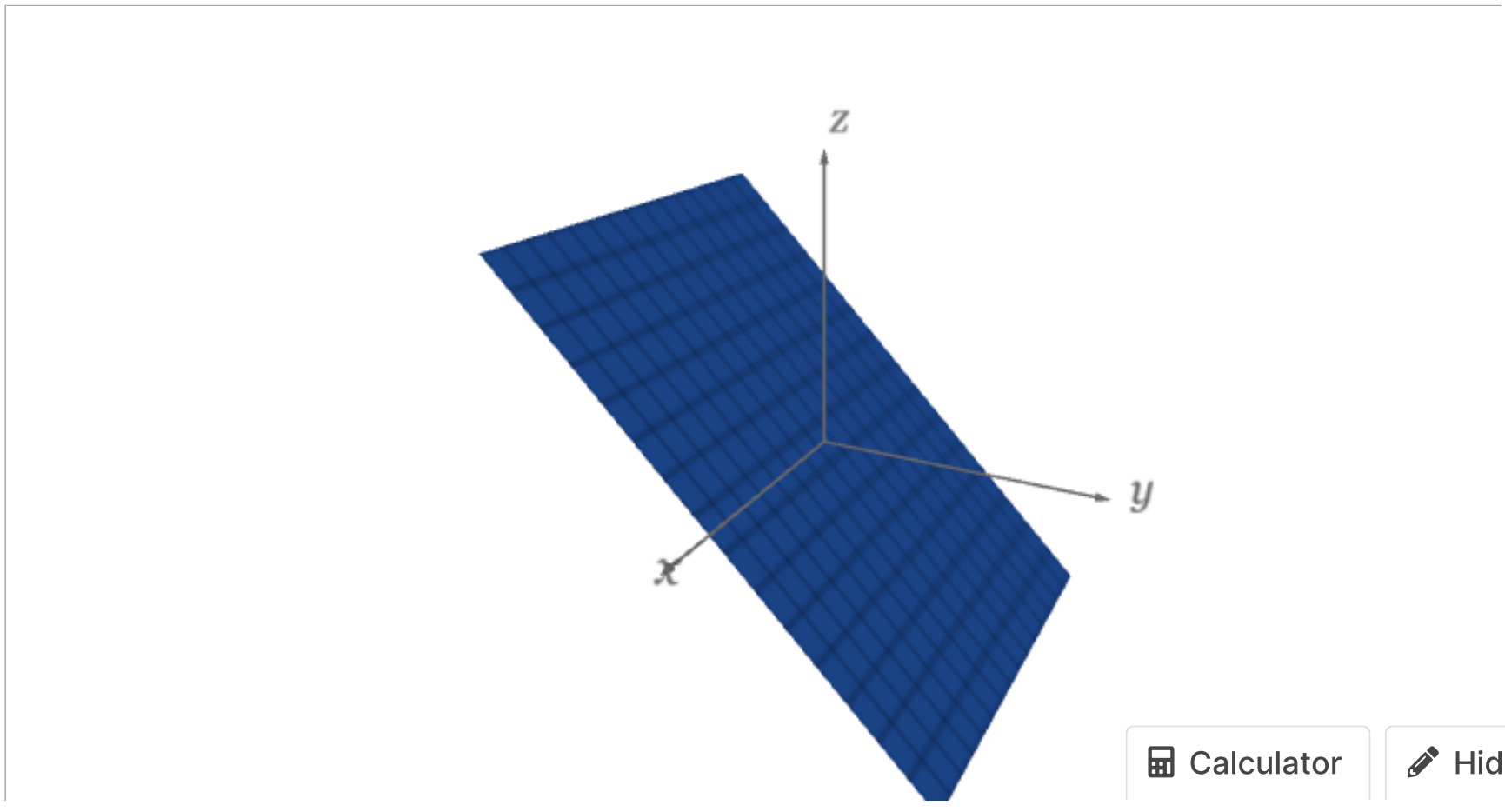
We've seen this example before in lecture 1. We want to understand the graph of a function $z = f(x, y)$ as a three dimensional surface. We are examining the specific example $z = -y$. This surface is the plane shown below.

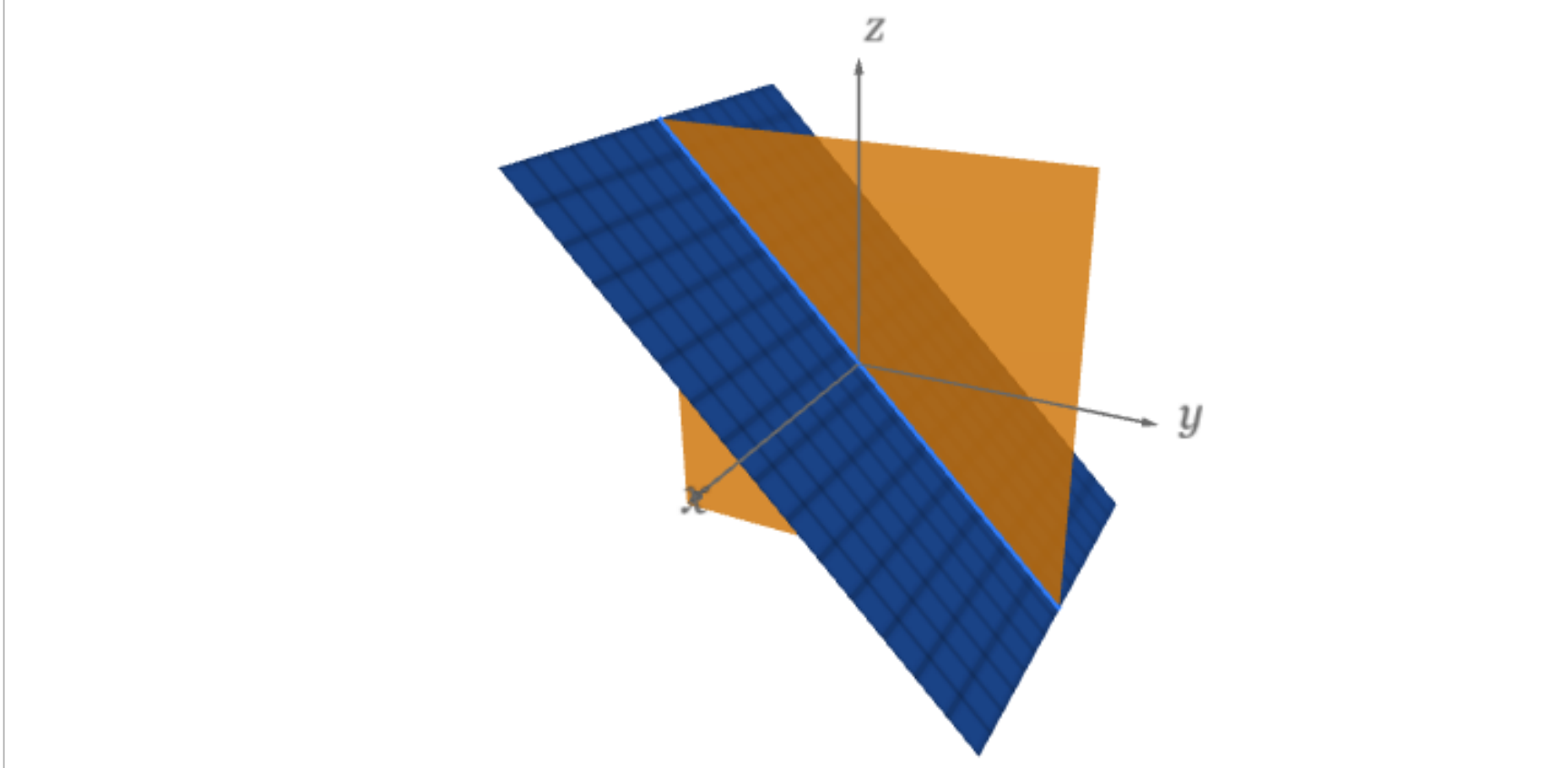
▶ **A plane**



Calculator Hide Notes

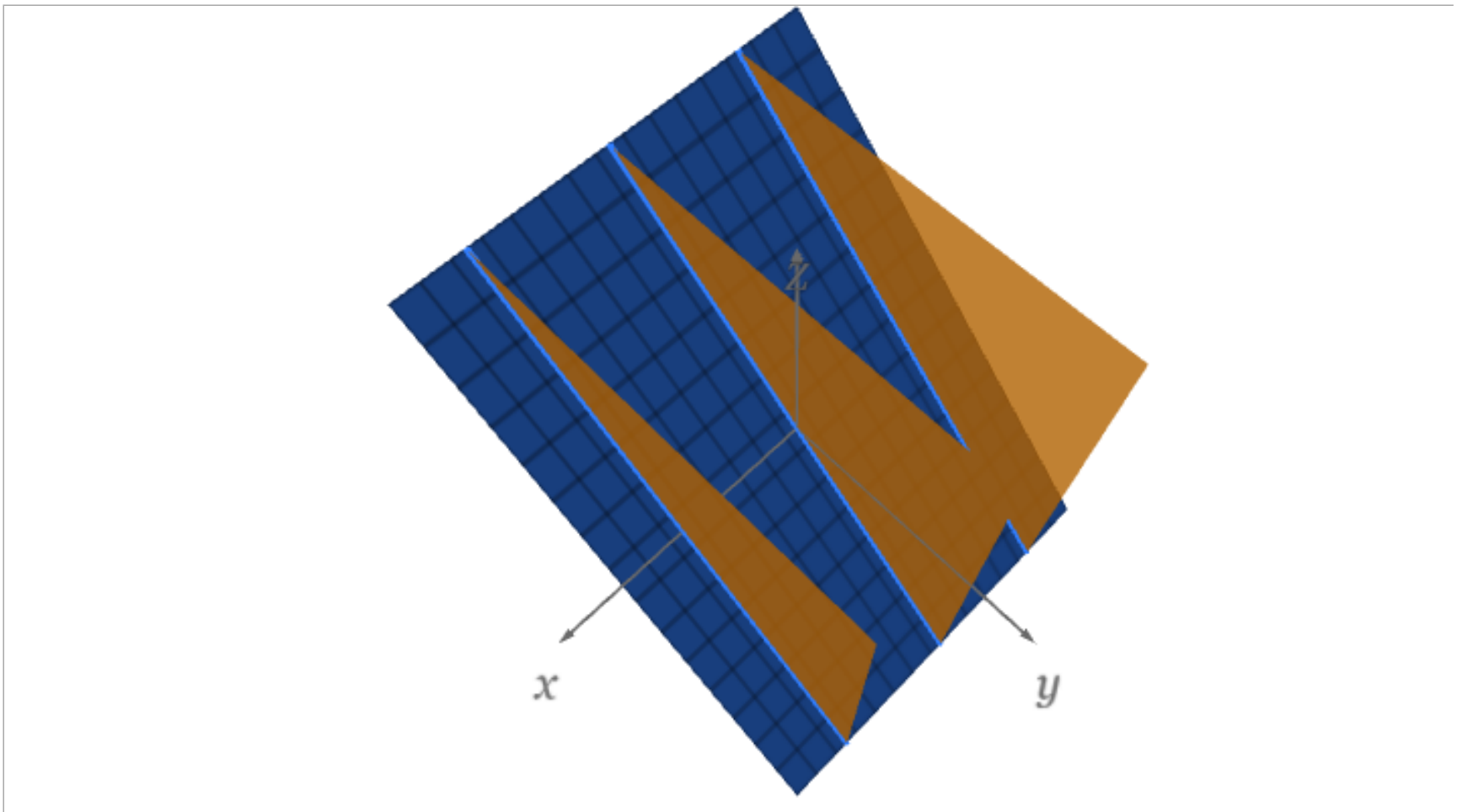
Given the function $f(x, y) = -y$, the first thing that we notice about this function is that there is no dependence on x. So we might look at what happens in the yz-plane. In the image below, we see the graph $z = -y$ in blue, and the yz-plane in orange. The part of our graph that lies on the yz-plane is the line $z = -y$ highlighted in blue where the two planes meet.

▶ **A plane sliced by the yz-plane**



Of course, our function $z = -y$ is completely independent of x, so if we look at what happens in other planes that are parallel to the yz-plane, we get line parallel to the line in the yz-plane.

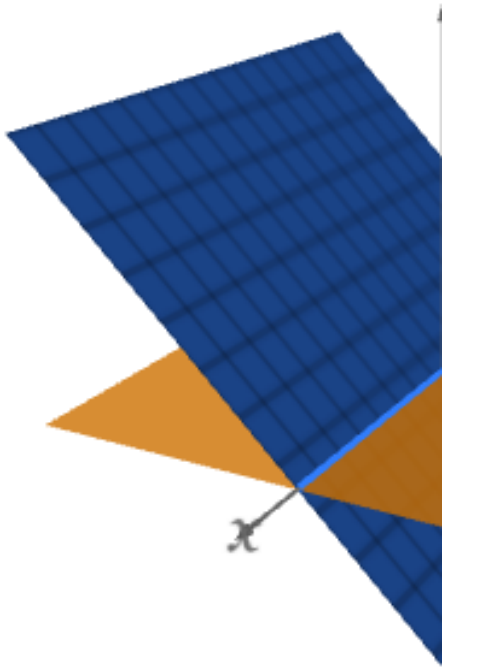
▶ **A plane sliced by several planes parallel to the yz-plane**

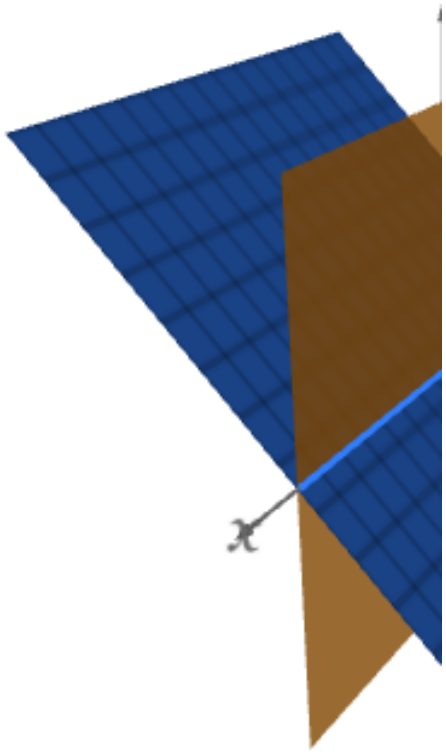


If we want to understand this surface better, we can look at what happens in the xy-plane and the xz-plane. In both cases we get the line that is the x-axis as shown below highlighted in light blue.

▶ **The xy and xz slices**

Calculator Hide Notes





Let's see how we can apply a similar process of looking at what happens to a surface $z = f(x, y)$ in different planes in order to determine its shape!

3. Review: Trying to draw a function of two variables

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