

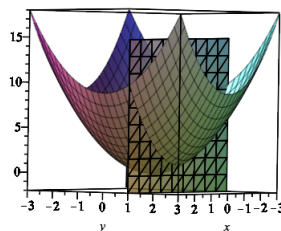
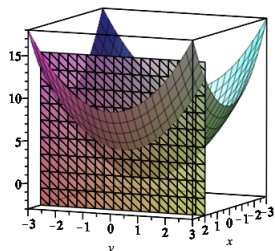
Preliminary Homework
Assigned Friday, November 1

Note: Preliminary homework is always graded credit or no credit. **You get full credit for completing the assignment, whether or not your answers are correct, as long as your work shows you have thought about the problem.** The purpose of preliminary homework is to start you thinking about the topic of the next class.

You may use your preliminary homework for in-class activities with your classmates. You should be sure to think about these questions so you will be prepared.

Preliminary homework is always due at the *beginning* of the next class.

Assignment: Let $f(x, y) = x^2 + y^2$, let γ_1 be the intersection of the graph of f with the vertical plane $x = 2$, and let γ_2 be the intersection of the graph of f with the vertical plane $y = 1$.



(1.) Let $h(x) = f(x, 1)$. Find $h'(2)$. What does this number say about the curve formed by intersecting the graph of f with the vertical plane $y = 1$?

(2.) Let $g(y) = f(2, y)$. Find $g'(1)$. What does this number say about the curve formed by intersecting the graph of f with the vertical plane $x = 2$?

(3.) Let $a = h'(2)$ and $b = g'(1)$. Find numbers c and d such that the plane $z = ax + by + d$ and the graph of f both contain the point $(2, 1, c)$.

(4.) Let $k(x, y) = ax + by + d$. Use the limit definition of tangent plane to show the graph of k is tangent to the graph of f at the point $(2, 1, c)$.