427L: limits and derivatives in 2 dimensions

1. Find an example of a function $f(x, y)$ so that *both*:
   - The limit of $f(x, y)$ as (x, y) approaches $(0, 0)$ along the line $(t, 2t)$ is zero, *and*
   - The limit of $f(x, y)$ as (x, y) approaches $(0, 0)$ along the line $(2t, t)$ is $1/2$.

2. Find the *normal vector* to the surface given by the graph of the function $f(x, y) = 6x^2y - xy^3 + 2y$ at the point $(1, 2, 2)$.