

§12.1: FUNCTIONS OF SEVERAL VARIABLES

1. Let $f(x, y) = x^2 - 2x^3 + 3xy$. Find an equation of the level curve that passes through the point
 - (a) $(-1, 1)$
 - (b) $(2, -1)$

2. If $T(x, y)$ gives the temperature at a point (x, y) on a thin metal plate in the xy -plane, then the level curves of T are called *isothermal curves*. All points on such a curve are at the same temperature. Suppose that a plate occupies the first quadrant, and that the temperature is given by $T(x, y) = xy$.
 - (a) Sketch the isothermal curves on which $T = 1$, $T = 2$, and $T = 3$ by hand.

 - (b) An ant, initially at the point $(1, 4)$ on the plate, wants to walk on the plate so that the temperature along its path remains constant. What path should the ant take and what is the temperature along that path?