MATH 20C: FUNDAMENTALS OF CALCULUS II
WORKSHEET, DAY #34 (EXAM #3 REVIEW)

Problem 1. Fill in the blank.

(a) The graph of a linear function is a _____ .

(b) The level curves of a linear function are _____ .

(c) The function $f(x, y, z) = 15 + xy + z$ is _____ .

(d) The set of points (x, y) such that $(x + 3)^2 + (y - 1)^2 = 4$ is a

_____ .

(e) The z-coordinate of a point is its _____ above the xy-plane.

Problem 2. Find the value of k such that $(2, k)$ is equidistant from $(0, 0)$ and $(-1, 2)$.

Problem 3. For $z = f(x, y) = 3y^2 - 2x^2$, find the equation of the cross section at $y = 1$ and give a description of this curve.

Problem 4. For $f(x, y) = \ln(x^2y + x)$, compute the partial derivatives $\dfrac{\partial f}{\partial x}, \dfrac{\partial f}{\partial y}$.

Problem 5. For $f(x, y) = x^2y^4 + 5y^2 - e^{x^2y} - 7$, compute the partial derivatives $\dfrac{\partial^2 f}{\partial x^2}, \dfrac{\partial^2 f}{\partial y^2}, \dfrac{\partial^2 f}{\partial x \, \partial y}$.

Problem 6. Find all releative extreme values of $f(x, y, z) = x^3 + x^2 - x + y^2 - y + z^2 - z - 1$ subject to $x + y + z = 0$. Use substitution to find and classify the critical points.