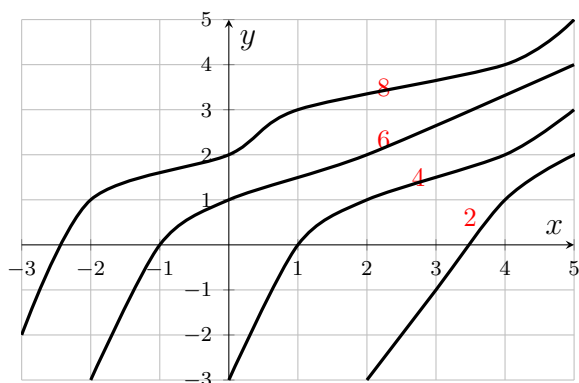


Name _____

Homework 2
Sections 12.3 – 12.5

- (2) Consider the function $h(x, y) = x^2 - 2y + xy + 6$. Determine another point on the same level set as $(3, 7)$.
- (5) Determine an equation of the plane which passes through the points $(2, -1, -4)$, $(5, 3, \frac{55}{2})$, and $(2, 3, 20)$.
- (4) Describe the level set of $F(x, y, z) = \sqrt{xyz}$ which contains the point $(3, 0, -5)$.

4. (2ea) The contour diagram of the function $f(x, y)$ is shown below.



- (a) At the point corresponding to $(2, 1)$ is the function increasing or decreasing with respect to x ?
- (b) At the point corresponding to $(4, 2)$ is the function increasing or decreasing with respect to y ?
- (c) Suppose a bug is walking along the graph of $f(x, y)$. If the bug walks in a straight line from the point corresponding to $(1, 3)$ to the point corresponding to $(4, 1)$, is the bug walking uphill or downhill?

5. (4) Describe the level surfaces of $f(x, y, z) = \cos^{-1} \left(-\sqrt{7 - z + x^2 + y^2} \right)$. Be sure to include all important information which may apply, such as orientation (up/down/left/right), vertex, radius, etc.

6. (4) Describe (geometrically) the level surface of $g(x, y, z) = \ln \left(\frac{147 - z^2 + 2x^2 + 2y^2}{x^2 + y^2 + 1} \right)$ which contains the point $(-4, 8, -8)$.