Math 208H, Section 1

Quiz number 1 solution

Show all work. How you get your answer is just as important, if not more important, than the answer itself. If you think it, write it!

1. For the function

$$z = f(x, y) = 3x - y^3$$

sketch the **level curves** for the values $z = -4$, $z = 0$, and $z = 4$, on the grid below. Be sure to label everything that you feel needs labelling. (Hint: thinking of x as a function of y might work better than the other way around...)

For level curves we look at points where $f(x, y) = c = \text{constant}$, so we have $3x - y^3 = c$, so $3x = y^3 + c$, so $x = \frac{1}{3}y^3 + \frac{c}{3}$. These look like the graph of $y = x^3$ (although shorter in the vertical direction), but with roles of x and y reversed, so they run off to the right rather than up. different values of c shift it left or right. Plotting a few points on each level curve helps us to give it the right scale.