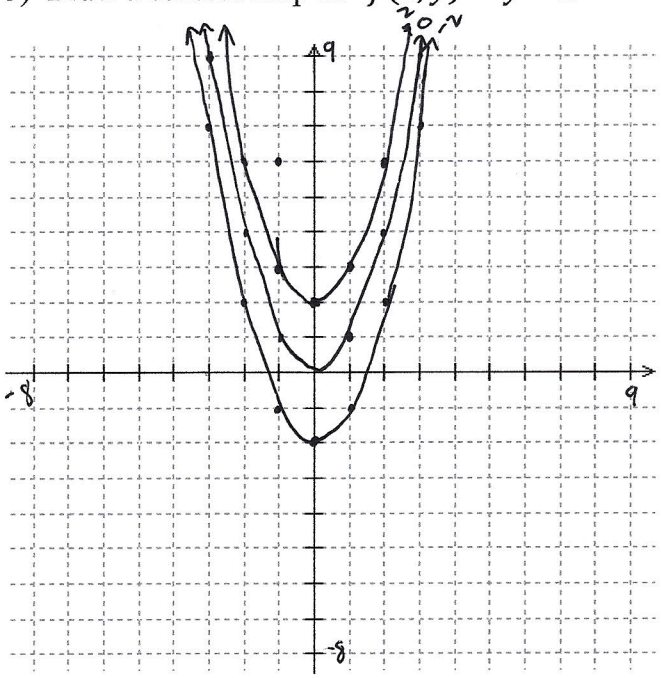
3) If $\mathbf{r}(t)$ is the position function of a particle what formula's would you use to compute the tangential and normal components of acceleration.

$$a_T = \frac{\vec{r}' \cdot \vec{r}''}{|\vec{r}'|} \qquad a_N = \frac{|\vec{r}' \times \vec{r}''|}{|\vec{r}'|}$$

5) Draw a contour map of $f(x,y) = y - x^2$



z

$K = y - x^2$

$y = x^2 + K$

6) Find and sketch the domain of f(x, y) = $f(x,y) = \sqrt{1 - x^2 - y^2}$

$1 - x^2 - y^2 \geq 0$

$1 \geq x^2 + y^2$

$x^2 + y^2 = 1$ is a circle, checking a point we see this is this is the inside and boundary of a circle