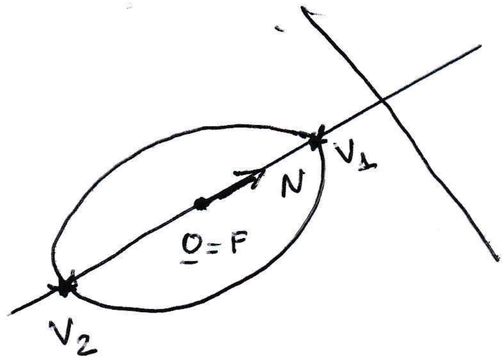
Hence the polar equation is, in our case,

$$\rho = \frac{1}{\frac{1}{2}\cos\vartheta + 1}$$

We know, by the theory of conics, that the closest and farthest points to L lie on the line spanned by N:



(If one does not remember this, it can be easily deduced from the polar equation, since $\|X\| = d(\underline{O}, L)$ is minimal (maximal) for $\cos\vartheta = 1$ $(\cos\vartheta = -1)$. Therefore, for such values of ϑ, also $d(X, L) = 2\|X\|$ is minimal (maximal).)

In conclusion the closest point V_1 ~~is~~ on the line spanned by N, with $\rho = \frac{1}{\frac{1}{2}\cdot 1 + 1} = \frac{1}{3/2} = 2/3$.

Therefore $V_1 = \frac{2}{3} N = \frac{2}{3}\cdot\frac{1}{5}(3,4) = \frac{2}{15}(3,4)$

The farthest point V_2 is on the ~~the~~ line spanned by N, on the opposite side of N with respect to $\underline{O}$, with

$$\rho = \frac{1}{\frac{1}{2}(-1)+1} = \frac{1}{1/2} = 2$$

Therefore $V_2 = -2N = -\frac{2}{5}(3,4)$.

<u>NOTE</u>: if ~~if~~ one does not know the polar equation (but you should, in any case...) the points V_1 and V_2 can be computed easily. One just remembers that