**2G Loci**

1. The curve $C$ is the locus of points that are equidistant from the line with equation $x+6=0$ and the point $(6,0)$. Prove that $C$ has Cartesian equation $y^{2}=4ax,$ stating the value of $a$.
2. The point $P$ lies on a parabola with equation $y^{2}=4ax$. Show that the locus of the midpoints of $OP$ is a parabola.