## 2C Parabolas \& Chords

1. A point $P(8,-8)$ lies on the parabola $C$ with equation $y^{2}=8 x$. The point $S$ is the focus of the parabola. The line I passes through $S$ and $P$.
a) Find the coordinates of $S$.
b) Find an equation for $l$, giving your answers in the form $a x+b y+c=0$, where $a, b, c$ are integers.
c) The line $l$ meets the parabola $C$ again at the point $Q$. The point $M$ is the mid-point of $P Q$. Find the coordinates of $Q$.
d) Find the coordinates of $M$.
e) Draw a sketch showing parabola $C$, the line $l$ and the points $P, Q, S$ and $M$.
2. The parabola $C$ has general point $\left(a t^{2}, 2 a t\right)$. The line $x=k$ intersects $C$ at the points $P$ and $Q$. Find, in terms of $a$ and $k$, the length of the chord $P Q$.
