Function $f(r)$ is the radial probability density function for the electron.

$$\begin{aligned} f(r) &= \int_0^{2\pi} \int_0^{\pi} |\psi_{100}|^2 r^2 \sin\theta \, d\theta \, d\phi \\ &= 4\pi |\psi_{100}|^2 r^2 \\ &= \frac{4r^2}{a_0^3} \exp\left(-\frac{2r}{a_0}\right) \end{aligned} \tag{1}$$

The derivative of $f(r)$.

$$\frac{df}{dr} = \frac{8r}{a_0^3}\left(1 - \frac{r}{a_0}\right) \exp\left(-\frac{2r}{a_0}\right) \tag{2}$$

Solve for $df/dr = 0$.

$$r = a_0$$