

7. [13 points] Consider the family of functions

$$y = ax^b \ln x$$

where a and b are nonzero constants.

- a. [4 points] Calculate $\frac{dy}{dx}$ in terms of the constants a and b .

- b. [9 points] Find specific values of a and b so that the resulting function has a local maximum at the point $(e, 1)$. You must show that $(e, 1)$ is a local maximum to receive full credit.