

5. (10 points) Consider the family of functions defined for $x \geq 0$ by $y = axe^{-bx}$ where a and b are positive numbers. Find all members of this family that pass through the point $(2, 3)$ and have a critical point at $x = 2$. Determine if this critical point is a local maximum, local minimum, or neither. If it is a local maximum or minimum, is it also a global maximum or minimum on this domain (i.e. for $x \geq 0$)?