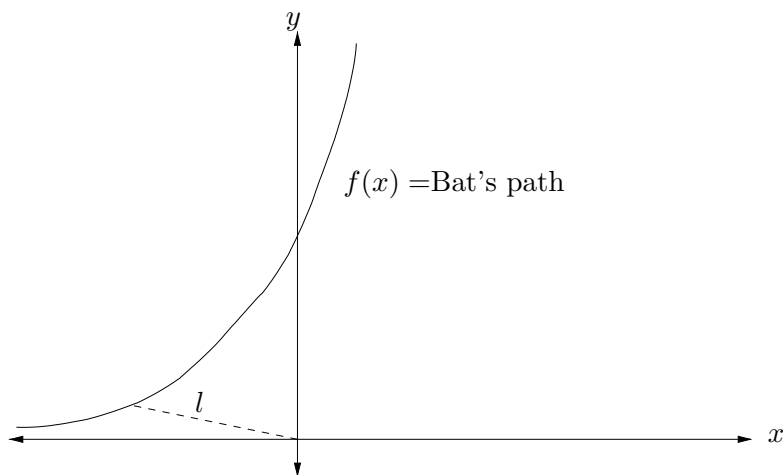


10. (11 points) Hiking through the forest you come upon a cave. As you stand outside the cave and peer in, a bat flies out towards you before veering off into the forest. The bat's path is given in the figure below where the origin represents where you are standing. The distance l represents the distance between you and the bat. Everything is measured in feet.



(a) Find a formula for l^2 in terms of x and $f(x)$.

(b) Let $D = l^2$ and find $\frac{dD}{dx}$.

(c) The minimum distance between you and the bat occurs when D is minimized. Find the value of x at this point in terms of $f(x)$ and $f'(x)$.

Continued on the next page!

(d) Suppose $f(x) = e^{x+3}$. If a bat comes within 5 feet of you, a panic attack will occur. (Remember that the distance between you and the bat is l , not D !) Did the bat induce a panic attack? [Hint: You are *encouraged* to use your calculator here!]