

Math 1A

Quiz 10 - November 4, 2009

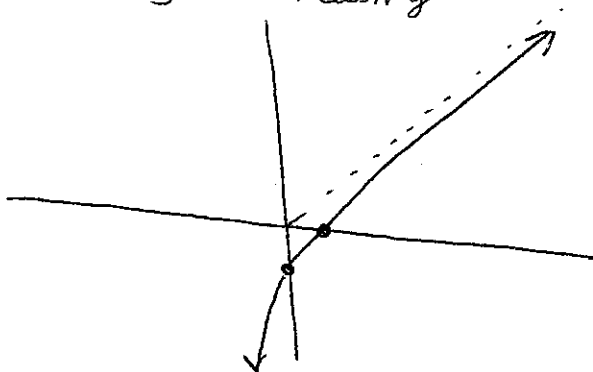
Name:

Key

1. Sketch the graph of the function $y = x - e^{-x}$.

Hint: Look at both terms for really big x .

For big positive x , $y \approx x - 0$ so $y \approx x$, so we have a slant asymptote of $y = x$. $y' = 1 + e^{-x}$ is always positive, so we have that y is always increasing.
 y -int is -1



2. Compute

$$\lim_{x \rightarrow 0^+} x^{1/x}$$

(show your work), and also compute the derivative of ~~_____~~ $x^{1/x}$.

$$L = \lim_{x \rightarrow 0^+} x^{1/x}, \quad \ln L = \lim_{x \rightarrow 0^+} \frac{1}{x} \ln x = \infty \cdot (-\infty) = -\infty$$

\uparrow \uparrow
 big pos # big neg #

So $L = e^{-\infty} = 0$.

$$y = x^{1/x}$$

$$\ln y = \frac{1}{x} \ln x$$

$$\frac{y'}{y} = \frac{-1}{x^2} \ln x + \frac{1}{x} \cdot \frac{1}{x}$$

$$y' = x^{1/x} \left(\frac{-\ln x + 1}{x^2} \right)$$

\uparrow
 this is y