1. [7 points] Let

$$p(w) = \frac{w}{1+e^w}.$$

a. [2 points] Evaluate each of the limits below. If a limit does not exist, including if it diverges to $\pm\infty$, write DNE. You do not need to show work.

i. $\lim_{w\to\infty} p(w)$

Answer: 0

ii. $\lim_{w\to-\infty} p(w)$

Answer: **DNE $(-\infty)$**

b. [5 points] Use the limit definition of the derivative to write an explicit expression for $p'(2)$. *Your answer should not involve the letter p. Do not attempt to evaluate or simplify the limit.* Write your final answer in the answer box provided below.

Answer: $p'(2) =$

$$\lim_{h\to 0} \frac{\frac{2+h}{1+e^{2+h}} - \frac{2}{1+e^2}}{h}$$