

1. [7 points] Let

$$g(w) = 1 - \frac{e^w}{6w}.$$

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. $\lim_{w \rightarrow \infty} g(w)$

Answer: $-\infty$ (DNE)

ii. $\lim_{w \rightarrow -\infty} g(w)$

Answer: 1

b. [5 points] Use the limit definition of the derivative to write an explicit expression for $g'(3)$. *Your answer should not involve the letter g . Do not attempt to evaluate or simplify the limit.* Write your final answer in the answer box provided below.

Answer: $g'(3) =$

$\lim_{h \rightarrow 0} \frac{\left(1 - \frac{e^{3+h}}{6(3+h)}\right) - \left(1 - \frac{e^3}{6 \cdot 3}\right)}{h}$
