

5. [16 points] Since it was first introduced, the number of users of the internet worldwide has increased dramatically. Let $I(t)$ denote the number (in millions) of worldwide internet users t years after 1995. Then $I(t)$ is given by the formula

$$I(t) = \begin{cases} 16(361/16)^{t/5} & \text{if } 0 \leq t \leq 5 \\ 361(1.18)^{t-5} & \text{if } 5 < t \leq 10 \\ A + 10(t - 10) & \text{if } t > 10 \end{cases}$$

- a. [3 points] Find A so that $I(t)$ is continuous.
- b. [4 points] Find the continuous growth rate of $I(t)$ in the year 1997.
- c. [3 points] Find the average rate of change of the number of internet users between 1995 and 2000.
- d. [6 points] Use the definition of the derivative to numerically estimate
(i) $I'(7)$ and (ii) $I'(10)$.