1. [10 points] You are looking to model the growth of a new TikTok hashtag `#Math105FUN` and you have some data to help you. Initially, at time $t = 0$, there are 100 videos with this hashtag. Ten days later (at time $t = 10$), there are 500 videos with this hashtag.

a. [3 points] If you assume the growth of this hashtag is linear, find an expression for the function $L(t)$ giving the number of videos with the hashtag `#Math105FUN` as a function of t given in days. Your function should match the data points you have so far.

$L(t) =$ _____

b. [3 points] If you assume, instead, that the growth of this hashtag is exponential, find an expression for the function $E(t)$ giving the number of videos with the hashtag `#Math105FUN` as a function of t given in days. Your function should match the data points you have so far.

$E(t) =$ _____

c. [2 points] You later get another piece of data: at day $t = 12$, the number of videos with the hashtag is 690. Which model—$L(t)$ vs. $E(t)$—better fits this new information? *Show all work.*

(Circle one) $L(t)$ IS A BETTER FIT $E(t)$ IS A BETTER FIT

d. [2 points] Let $H(t)$ denote the total number of videos with a different hashtag — `#Math105studyfest` — t days after September 20, 2023. We want a new function $G(s)$ that instead denotes the total number of `#Math105studyfest` videos s days after September 30, 2023. How can we write $G(s)$ in terms of $H(t)$?

$G(s) = \ldots$ (Circle the best answer)

$H(s-10)$ $H(s+10)$ $H(s)+10$ $H(s)-10$