- 7. [8 points] For each question below, circle TRUE or FALSE or NEI (Not Enough Information). Justify your answer briefly. No partial credit if explanation is left blank.
 - **a**. [2 points] The exponential function $f(t) = e^{1.02t}$ grows more slowly than the exponential function $g(t) = 1.05^t$.

TRUE FALSE NEI

Explanation:

Solution: The growth factor of $f(t) = e^{1.02t} = (e^{1.02})^t$ is $e^{1.02} > e \approx 2.7$ while the growth factor of g(t) is 1.05.

- **b.** [2 points] If a exponential function E(t) decays by 15% between t = 0 and t = 2, it will also decay by 15% between t = 1 and t = 3.
 - TRUE FALSE NEI

Explanation:

Solution: Exponential functions have a constant percent decay rate. Therefore, E(t) will decay by the same percent over these two intervals of the same width.

c. [2 points] The function log(x) grows so slowly that it eventually approaches a horizontal asymptote.

TRUE FALSE NEI

Explanation:

Solution: The limit as $x \to \infty$ of $\log(x)$ is ∞ . In fact, for any value *a* you'd want to see as an output of $\log(x)$, you can input 10^a and you'll get $\log(10^a) = a$.

d. [2 points] If the doubling time of exponential function h(t) is 25 years, then its annual growth factor is $\frac{\log 2}{\log 25}$.

TRUE

FALSE NEI

Explanation:

Solution: Since h(t) is exponential, it has the form $h(t) = ab^t$. If the doubling time is 25 years, then $ab^{25} = h(25) = 2h(0) = 2ab^0 = 2a$. Therefore, $b^{25} = 2$, and the growth factor is $b = 2^{1/25} \approx 1.03$ while $\frac{\log 2}{\log 25} \approx 0.22$.