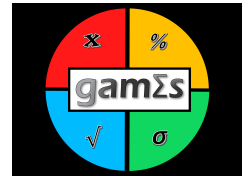


GAMES Practice Problems – Growth of Functions



1. Is the following function exponential: $G(t) = (3t)^4$

If so, write the function in the form $G(t) = ab^t$ and enter the values you find for a and b .

2. Write the given exponential function in the form ab^t and identify the initial value and the growth factor:

$$Q = 65 * 2^{-t}$$

3. Rewrite the following logarithmic equation as an equivalent exponential equation:

$$\log_3(27) = 3$$

4. Rewrite the logarithmic expression $\log(A\sqrt{B}) + \log(A^2)$ in equivalent logarithmic form. There may be more than one correct answer.

5. A new Youtube channel currently has 12 subscribers. But its creator is very optimistic and expects that the number of subscribers will grow exponentially, tripling every 10 days. How long will it take (in days) for there to be 110 subscribers?

6. A certain virus population V obeys the exponential growth law $V(t) = 2500e^{t/2}$, where t is in days?

(a) How many virus are present initially?

(b) At what time will there be 10000 virus?

7. Let $Q = f(t) = 15(0.94)^{t/3}$ be the number of grams of a radioactive substance remaining after t years.

(a) What is the initial quantity of the radioactive substance?

(b) What is the annual decay rate of the substance?

(c) Evaluate: $f(6)$

(d) Find a formula for f^{-1} and evaluate $f^{-1}(6)$.

8. Twenty percent of a radioactive substance decays in ten years. By what percent does the substance decay each year?

9. Find the following limit by making use of l'Hospital's Rule. Make sure you understand the need for using this rule. It maybe necessary to apply the rule more than once.

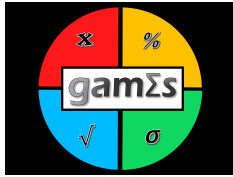
(a) $\lim_{x \rightarrow \infty} \frac{7e^x}{2x^3}$

(b) $\lim_{x \rightarrow e} \frac{e-x}{\ln(x)-1}$

10. Find the following limits by making use of l'Hospital's Rule (you will need to convert them into a ratio before using the rule):

(a) $\lim_{x \rightarrow \infty} 7x - 7 \ln x$

(b) $\lim_{x \rightarrow \infty} 6xe^{1/x} - 6x$



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