GAMES Practice Problem Solutions – Growth of Functions

1. No, G(t) is not exponential. It can be written as $G(t) = 3^4t^4$ which is not of the form $G(t) = ab^t$.
2. $Q = 65 * (\frac{1}{2})^t$; thus the initial value = 65 and the growth factor is $\frac{1}{2}$.
3. $27 = 3^3$
4. $\frac{1}{2}\log(B) + \log(A^3)$ or $\log(A^3\sqrt{B})$ or $\frac{1}{2}\log(B) + 3\log(A)$ or $\log(A) + \log(A^2) + \frac{1}{2}\log(B)$
5. approximately 21 days
6. (a) 2500
   (b) 2.77 i.e. 3 days
7. (a) 15 grams
   (b) 0.0204 i.e. 2.04%
   (c) 13.254,
   (d) $t = \frac{3\ln(Q/15)}{\ln(0.94)}$, $f^{-1}(6) = 44.426$
8. 0.02207 i.e. 2.207% per year
9. (a) $\lim_{x\to\infty} \frac{7e^x}{2x^3} = \lim_{x\to\infty} \frac{7e^x}{6x^2} = \lim_{x\to\infty} \frac{7e^x}{12x} \lim_{x\to\infty} \frac{7e^x}{12} = \infty$.
   (b) $\lim_{x\to e} \frac{e-x}{\ln(x)-1} = \lim_{x\to e} \frac{-1}{1/x} = -e$
10. (a) $\lim_{x\to\infty} 7x - 7\ln x = \lim_{x\to\infty} \frac{7-7(1/x)\ln x}{1/x} = \infty$
    (b) $\lim_{x\to\infty} 6xe^{1/x} - 6x = 6\frac{e^{1/x}-1}{1/x} = 6$