Practice Assignment 1

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$(\log n + 1)^3$ 7^{2n} $n^{\frac{1}{2}}$ $n^{\log_3 7}$ 2^{7n} $1000(\log n)^2$

$= (\log n)^3$ ③ ④ ⑥ ⑥ ① ⑤

$2^{\log_2 n}$ $n \log n$ $5^{\log_2 n}$

n ③

⑤ $n \log n$ ④

1) 2^n 7^{2n} $5^{\log_5 n}$ $n \log n$ $2^{\log_2 n}$ $n^{\log_3 7}$ $n^{\frac{1}{2}}$ $(\log n + 1)^3$ $1000(\log n)^2$

2) a) $\lim_{n \to \infty} \frac{3n+6}{10000n - 500} = \frac{3}{10000}$ $f = \Theta(g)$

b) $\lim_{n \to \infty} \frac{n^{\frac{1}{2}}}{n^{2/3}} = \frac{1}{n^{\frac{1}{6}}} = \frac{1}{\infty} = 0$ $f = O(g)$

c) $\lim_{n \to \infty} \frac{\log(7n)}{\log(n)} = 1$ $f = \Theta(g)$

d) $\lim_{n \to \infty} \frac{n^{3/2}}{n \log n} = \lim_{n \to \infty} \frac{n^{\frac{1}{2}}}{\log n} = \infty$ $f = \Omega(g)$

e) $\lim_{n \to \infty} \frac{\sqrt{n}}{(\log n)^3} = \infty$ $f = \Omega(g)$ $(f_{\text{from}} \neq 1)$

f) $\lim_{n \to \infty} \frac{n^2}{3^n} = 0$ $f = O(g)$