Eclipse, Kliezl P. Exercise 2.1 – 9

Q: For each of the following pairs of functions, indicate whether the first function of each of the following pairs has a lower, same, or higher order of growth (to within a constant multiple) than the second function.

a. $n(n + 1)$ and $2000n^2$
b. $100n^2$ and $0.01n^3$
c. $\log_2 n$ and $\ln n$
d. $\log_2^2 n$ and $\log_2 n^2$
e. 2^{n-1} and 2^n
f. $(n - 1)!$ and $n!$

A:

a. $n(n + 1) \approx n^2$ has same order of growth as $2000n^2$ to within a constant multiple
b. $100n^2$ has a lower order of growth than $0.01n^3$
c. $\log_2 n$ has same order of growth as $\ln n$
d. $\log_2^2 n$ has a higher order of growth than $\log_2 n^2$
e. 2^{n-1} has the same order of growth as 2^n to within a constant multiple
f. $(n - 1)!$ has a lower order of growth than $n!$