Worksheet on Determining Big-O

Hierarchy of orders

Use this ordering of orders in determining the Big-O of the functions below
$O(1) \subset O(\log(n)) \subset O(n^{1/2}) \subset O(n) \subset O(n \log(n)) \subset O(n^2) \subset O(n^3) \subset \ldots \subset O(2^n) \subset O(n!)$

Problems

For each function f (where n is a positive integer, i.e. n = 0, 1, 2, ...) determine the smallest function g in the order hierarchy such that f is O(g).

1. $f(n) = (2+n)(3+\log(n))$

2. $f(n) = 12\log(n) + \frac{n}{2} - 3452$

3. $f(n) = 1+2+3+\ldots+n$

4. $f(n) = 1^2+2^2+3^2+\ldots+n^2$

5. $f(n) = n(3+n) - 7n$

6. $f(n) = 7n + (n+1)\log(n-4)$

7. $f(n) = \log(n^2) + n$

8. $f(n) = \frac{(n+1)\log(n+1) - (n+1) + 1}{n}$

9. $f(n) = n + n/2 + n/4 + n/8 + \ldots$