26. The approach in these problems is to pick out the most rapidly growing term in each sum and discard the rest (including the multiplicative constants).

a) This is \( O(n^3 \cdot \log n + \log n \cdot n^2) \), which is the same as \( O(n^3 \cdot \log n) \).

b) Since \( 2^n \) dominates \( n^2 \), and \( 3^n \) dominates \( n^3 \), this is \( O(2^n \cdot 3^n) = O(6^n) \).

c) The dominant terms in the two factors are \( n^n \) and \( n! \), respectively. Therefore this is \( O(n^n n!) \).

30. a) This follows from the fact that for all \( x > 7 \), \( x \leq 3x + 7 \leq 4x \).

b) For large \( x \), clearly \( x^2 \leq 2x^2 + x - 7 \). On the other hand, for \( x \geq 1 \) we have \( 2x^2 + x - 7 \leq 3x^2 \).

c) For \( x > 2 \) we certainly have \( |x + \frac{1}{2}| \leq 2x \) and also \( x \leq 2|x + \frac{1}{2}| \).

d) For \( x > 2 \), \( \log(x^2 + 1) \leq \log(2x^2) = 1 + 2 \log x \leq 3 \log x \) (recall that \( \log \) means \( \log_2 \)). On the other hand, since \( x \leq x^2 + 1 \) for all positive \( x \), we have \( \log x \leq \log(x^2 + 1) \).

e) This follows from the fact that \( \log_{10} x = C(\log_2 x) \), where \( C = 1/\log_2 10 \).