Problem 60-1

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1 $3n^2 + 2n + 1 = O(n^2)$

When we apply the first defenition of O we get $\lim_{x\to\infty} \frac{3n^2+2n+1}{n^2}$. You do L'Hospital's rule twice and you find that it converges to 3.

2 $O(f + g) = O(max(f, g))$

h=O(f+g) so h

3 $O(f * g) = O(f) * O(g)$

4 If f=O(g) and g=O(h) then f=O(h)

For some constant k, $f(n) < c * g(n) < k * h(n)$ therefore $f(n)) < k * h(n)$ and f=O(h).