Ex 2.14. Solution. (Lecture 7 Slide 7).

$$f(x) = \sum_{i=0}^{N} a_i x^i$$

poly = 0.
for (i=n; i≥0; --i)
    poly = x*poly + a[i]

a) $x = 3$ $f(x) = 4x^4 + 8x^3 + x + 2$

        $N = 4$, we know $x = 3$.

So $i = 4$ $a[4] = 4$ poly $= 3 * 0 + 4 = 4$

     $i = 3$ $a[3] = 8$ poly $= 3 * 4 + 8 = 20$

     $i = 2$ $a[2] = 0$ (no x^2 term in $f(x)$)   poly $= 3 * 20 + 0 = 60$

     $i = 1$ $a[1] = 1$ poly $= 3 * 60 + 1 = 181$.

     $i = 0$ $a[0] = 2$ poly $= 3 * 181 + 2 = \underline{\underline{545}}$

b) $\sum_{i=0}^{N} a_i x^i = a_N x^N + a_{N-1} x^{N-1} + \ldots a_1 x + a_0$

$$= \underbrace{x(x \ldots x(x(x (a_N) + a_{N-1}) + a_{N-2}) \ldots a_1) + a_0}$$

c) N multiplications. So $O(N)$