Exercises for "Maple Essentials, Lesson 1"

1. For the polynomial $p(x) = 3x^4 + 5x^3 + 2x^2 - x + 2$, use Maple to:

(a) find $p(2)$

(b) find the sequence of values $p(k)$ for k=0, 1, 2, ... 20.

(c) find $p(a+1)$, expanded in powers of a.

2. Now suppose $p(x) = a x^4 + b x^3 + c x^2 + d x + e$.

Using the Maple command "eval", find the value of $p(x)$ at $x = 1.4$, if $a = 2.1$, $b = 3.3$, $c = 1.1$, $d = 5.4$, and $e = 6.5$.

Do this in two ways:
(a) all at once (i.e., $x := 1.4$, $a =: 2.1$, etc.)
(b) First evaluating the coefficients to get a polynomial $p(x)$ with numerical coefficients, then evaluating this polynomial at $x = 1.4$.

3. Expand $(3 + 4x)^{10}$ in powers of x.

4. Obtain, in the form of a sequence, the expansions of $(1 + x)^n$ in powers of x for integers n from 0 to 25.

5. (a) Use Maple to factor the polynomial $p(x) = x^8 + x^7 - 7x^6 - 17x^5 - 6x^4 + 28x^3 + 28x^2 - 4x - 24$.

(b) Use the "expand" command to check your result.

(c) The Maple command "expand" will write the polynomial with smallest powers of x first. Use the "sort" command on this result to rewrite this polynomial with highest powers of x first.

(d) How might you use "evalb" to check your result without first rewriting the "expanded" polynomial in standard order?

6. Put the expression $\frac{3x+5}{(x+2)^2-6} + \frac{6x+5}{x+4} + \frac{x^2+5x+1}{3x+2}$ over a common denominator. Then use the command "numer" and "denom" to pick off the numerator and denominator.

7. Express $sin(8t) - sin(7t) + sin(6t) - sin(5t)$ as a sum of products of powers of $sin(t)$ and $cos(t)$.