Taylor's polynomial

Write Taylor's polynomial of degree n of function f at point x_0.

1. $f(x) = \cos x^2$, $n = 3$ and $x_0 = \sqrt{\pi}$
2. $f(x) = \ln(x + 1)$, $n = 4$ and $x_0 = 0$
3. $f(x) = (2x + 1) \ln x$, $n = 2$ and $x_0 = 1$
4. $f(x) = (x + 1)e^x$, $n = 3$ and $x_0 = 0$,
   also write the formula for the remainder R after the n–th term.

Write (a) Taylor's polynomial of degree n of function f at point x_0, (b) write the formula for the remainder R after the n–th term.
(c) By using this calculate approximately the functional value $f(x_1) \doteq ?$ and estimate the error of your approximation:

5. $f(x) = e^{3x}$, $n = 4$, $x_0 = 0$ and $x_1 = 0.1$
6. $f(x) = \sqrt{6 - 3x}$, $n = 2$, $x_0 = -1$ and $x_1 = -1.1$

Calculate approximately with the accuracy of ϵ:

7. $\ln 1.2$, $\epsilon = 10^{-3}$
8. $\sqrt[3]{1.5}$, $\epsilon = 10^{-2}$