A "nice" function is equal to its Taylor Series at all x where the series converges. You should know this series, its interval of convergence, and its radius of convergence from Calc 2.

$$\frac{1}{1-x} = 1 + x + x^2 + x^3 + \ldots, \quad \text{for } -1 < x < 1, \ R = 1.$$

Using just this fact, write down the first four nonzero terms of the Taylor Series for these functions, and indicate their interval of convergence and radius of convergence. I gave a hint on the first one.

1. $f(x) = \dfrac{3}{1-2x} = 3\dfrac{1}{1-(2x)}$

2. $f(x) = \dfrac{x}{1+2x^2}$

3. In problem 2, you showed that $\dfrac{x}{1+2x^2} = \displaystyle\sum_{n=0}^{\infty} c_n x^n$, where

$c_0 = \underline{\quad}, \quad c_1 = \underline{\quad}, \quad c_2 = \underline{\quad}, \quad c_3 = \underline{\quad}, \quad c_4 = \underline{\quad}, \quad c_5 = \underline{\quad}, \quad c_6 = \underline{\quad}, \quad c_7 = \underline{\quad}.$

4. Now, do your problem 5 on the WeBWorK.