Answers to Practice Questions on Taylor Series

1. (a) $T_2(x) = \ln(1+x) = x - \frac{x^2}{2}$.
   (b) $T_3(x) = 2x^3 - 2x + 1$.
   (c) $T_3(x) = 1 + 4(x-1+6(x-1)^2 + 2(x-1)^3$.
   (d) $T_3(x) = 2 + \frac{3}{2}(x-1) - \frac{1}{8}(x-1)^2 + \frac{1}{16}(x-1)^3$, $0.9 + \sqrt{0.9} \approx 1.8486875$.

2. (a) $f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n 3^{2n+1}}{5^{n+1}} x^{3n}$ if $|x| < (5/9)^{1/3}$
   (b) $f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n 2^{2n}}{(2n+1)!} x^{4n+2}$ for all values of x.
   (c) $f(x) = x - \frac{7}{6}x^3 + \frac{141}{120}x^5 + ...$ for all x.

3. (a) $\frac{e^{0.2}}{5^5 5!}$.
   (b) $\frac{15(0.1)^4}{16(0.9)^{7/2}4!}$.
   (c) $J = [0.9, 1.1]$.
   (d) $n = 3$.