6. The function f has a Taylor series about $x = 1$ that converges to $f(x)$ for all x in the interval of convergence.

   It is known that $f(1) = 1$, $f'(1) = -\dfrac{1}{2}$, and the nth derivative of f at $x = 1$ is given by $f^{(n)}(1) = (-1)^n \dfrac{(n-1)!}{2^n}$

   for $n \geq 2$.

   (a) Write the first four nonzero terms and the general term of the Taylor series for f about $x = 1$.

   (b) The Taylor series for f about $x = 1$ has a radius of convergence of 2. Find the interval of convergence. Show the work that leads to your answer.

   (c) The Taylor series for f about $x = 1$ can be used to represent $f(1.2)$ as an alternating series. Use the first three nonzero terms of the alternating series to approximate $f(1.2)$.

   (d) Show that the approximation found in part (c) is within 0.001 of the exact value of $f(1.2)$.

_____

STOP

END OF EXAM