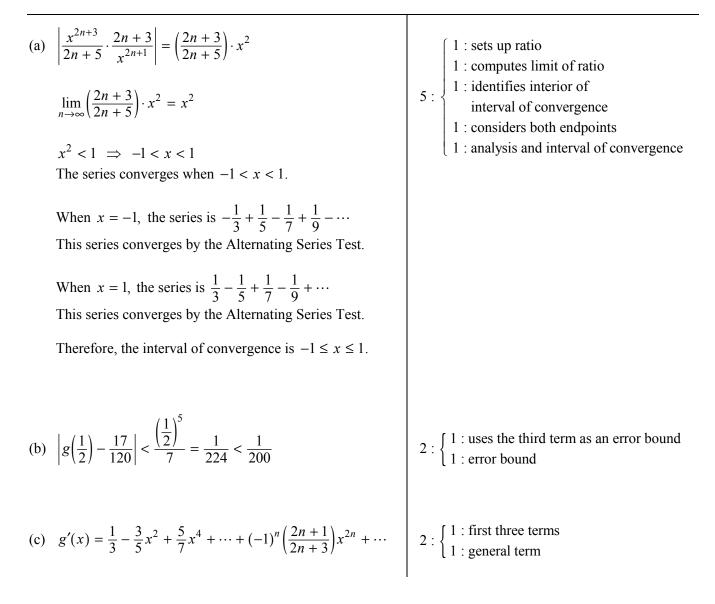
## AP<sup>®</sup> CALCULUS BC 2012 SCORING GUIDELINES

## **Question 6**

The function g has derivatives of all orders, and the Maclaurin series for g is

 $\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+3} = \frac{x}{3} - \frac{x^3}{5} + \frac{x^5}{7} - \cdots.$ 

- (a) Using the ratio test, determine the interval of convergence of the Maclaurin series for g.
- (b) The Maclaurin series for g evaluated at  $x = \frac{1}{2}$  is an alternating series whose terms decrease in absolute value to 0. The approximation for  $g(\frac{1}{2})$  using the first two nonzero terms of this series is  $\frac{17}{120}$ . Show that this approximation differs from  $g(\frac{1}{2})$  by less than  $\frac{1}{200}$ .
- (c) Write the first three nonzero terms and the general term of the Maclaurin series for g'(x).



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