

February 21

How can you use the ratio test to find the interval of convergence?

$$\sum a_n x \quad \lim_{n \rightarrow \infty} \left| \frac{a_{n+1} x}{a_n x} \right| = 0$$

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Students will verbally explain how to find the interval and radius of convergence

(using the words:  
geometric, ratio test...)

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6. Let  $f$  be a function with derivatives of all orders and for which  $f(2) = 7$ . When  $n$  is odd, the  $n$ th derivative of  $f$  at  $x = 2$  is 0. When  $n$  is even and  $n \geq 2$ , the  $n$ th derivative of  $f$  at  $x = 2$  is given by  $f^{(n)}(2) = \frac{(n-1)!}{3^n}$ .
- (a) Write the sixth-degree Taylor polynomial for  $f$  about  $x = 2$ .
  - (b) In the Taylor series for  $f$  about  $x = 2$ , what is the coefficient of  $(x-2)^{2n}$  for  $n \geq 1$ ?
  - (c) Find the interval of convergence of the Taylor series for  $f$  about  $x = 2$ . Show the work that leads to your answer.
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**WRITE ALL WORK IN THE TEST BOOKLET.**

**END OF EXAM**

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