Wednesday, March 29

Announcements

WeBWorK #11 is due tonight at 9pm

Quiz #4 regrades will be available on Friday

After Quiz #5

- Solutions available online (as of last Friday evening)
- Quizzes returned online by Friday

Wednesday, March 29

Clicker Questions

Clicker Question 1

Related series

Suppose that the series $\sum_{n=3}^{\infty} A_n(-6)^n$ converges. What can we say about the radius of convergence, R, of the power series

$$\sum_{n=3}^{\infty} A_n n(n-1)x^{n-2}$$ centred at 0?

A. $R = 6$

B. $R \leq 6$

C. $R \geq 6$

D. $|R| = 6$

E. none of the above

Double derivative

Let $f(x) = \sum_{n=3}^{\infty} A_n x^n$; since the series converges at $x = -6$, its radius of convergence is at least 6. But $f''(x) = \sum_{n=3}^{\infty} A_n (x^n)'' = \sum_{n=3}^{\infty} A_n n(n-1)x^{n-2}$ has the same radius of convergence as the series for $f(x)$ itself; so $R \geq 6$.

Clicker Question 2

Finding a Taylor series

The Taylor series for the function $f(x) = 1/(x-5)^3$ centred at $c = 7$ has the form

$$A_0 + A_1(x-7) + A_2(x-7)^2 + A_3(x-7)^3 + A_4(x-7)^4 + \cdots.$$

The five numbers below are A_0, A_1, A_2, A_3, A_4 in some order. Which one is A_3?

A. $-\frac{5}{32}$

B. $\frac{1}{8}$

C. $\frac{3}{16}$

D. $-\frac{3}{16}$

E. $\frac{15}{128}$

The calculation

The Taylor series at c for a function $f(x)$ is

$$\sum_{n=0}^{\infty} \frac{f^{(n)}(c)}{n!}(x-c)^n,$$

so $A_3 = f^{(3)}(7)/3! = f'''(7)/6$. Since

$$f'''(x) = (-3)(-4)(-5)/(x-5)^6,$$

we get $f'''(7) = (-60)/2^6 = -15/16$.