MATH 10A with Prof. Stankova
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Discussion on Taylor Polynomials, Geometric Sequences and Antiderivatives

Quick Check:

1. find $\lim_{x \to \infty} \frac{\sqrt{9x+6}}{\sqrt{x+1}+2}$

2. find $\lim_{n \to \infty} (1 + \frac{1}{n})^n$

3. find the derivative of $y = x^{e^x}$

4. (Extra) A car is traveling north toward an intersection at a rate of 60 mph while a truck is traveling east away from the intersection at a rate of 50 mph. Find the rate of change of the distance between the car and truck when the car is 3 miles south of the intersection and the truck is 4 miles east of the intersection.

1 Taylor Polynomials

1. Find the linearization $L(x)$ of function at given a
   (a) $f(x) = \sqrt[3]{x^2}2x - x^2$, $a = 1$
   (b) $f(x) = \frac{2x^5 + x^2 - 5}{x^2}$, $a = 1$

2. Find the approximate value of $(0.9998)^7$

3. Find the Taylor Polynomials of degree n centered at the number a
   $f(x) = \frac{1}{1-x}$, $n = 3$, $a = 0$

2 Geometric Sequences

1 Use limit to prove the sum of the infinite geometric series:
   $a + ar + ar^2 + ar^3 + ... + ar^n + ... = \frac{a}{1-r}$

2 Find $\lim_{n \to \infty}[(\frac{1}{2})^{-n} + 6^{-n}]$

3 Express the number as a ratio of integers: $4.1\overline{6}$

3 Antiderivatives

Find the general antiderivative of the function

1. $f(x) = x^2 + 5x + 7$

2. $f(x) = \frac{2x - x^3}{x^2}$

3. $f(x) = e^{sinx} cosx$

4. $f(x) = 3cosx + \frac{2x^4 - \sqrt{x}}{x}$