MATH 170B: Discussion 1

Apr 2018

1 Limit

Consider the following limits

(1). Use the definition of the limit to show that $\lim_{x\to 2} 5x - 4 = 6$.

(2). Use the definition of the limit to show that $\lim_{x\to 0^+} \sqrt{x} = 0$.

2 Big O notation

Section 1.2.6: For the pairs (x_n, α_n), is it true that $x_n = \mathcal{O}(\alpha_n)$ as $n \to \infty$?

(1) $x_n = 5n^2 + 9n^3 + 1$, $\alpha_n = n^2$.

(2) $x_n = \sqrt{n+3}$, $\alpha_n = \frac{1}{n}$

3 Taylor Series

(1) **Section 1.1.9**: Prove that if f is differentiable at x, then

$$\lim_{h \to 0} \frac{f(x+h) - f(x-h)}{2h} = f'(x)$$

(2) Derive the Taylor series at 2 for the function $f(x) = \ln(x+1)$.