Homework 3

1. Using an $\epsilon - \delta$ argument, prove that $\lim_{x\to 3}(5x+7) = 22$.
2. Using an $\epsilon - \delta$ argument, determine $\lim_{x\to 3} x^3$.
3. Using an $\epsilon - \delta$ argument, prove that $\lim_{x\to 3} \frac{1}{x+1} = \frac{1}{4}$.
4. Using an $\epsilon - \delta$ argument, prove that $\lim_{x\to 1} \frac{2x^2+1}{x+2} = 1$.
5. Using an $\epsilon - \delta$ argument, find $\lim_{x\to 2} \frac{x^2-4}{x-2}$.
6. Find $\lim_{x\to 4} \frac{\sqrt{x}-2}{x-4}$.
7. Prove that for every $c > 0$, $\lim_{x\to c} \sqrt[3]{x} = \sqrt[3]{c}$.
8. Prove that $\lim_{x\to 2} \frac{1}{x-2}$ does not exist.
9. Prove that $\lim_{x\to 0} \sin \frac{1}{x^2}$ does not exist.