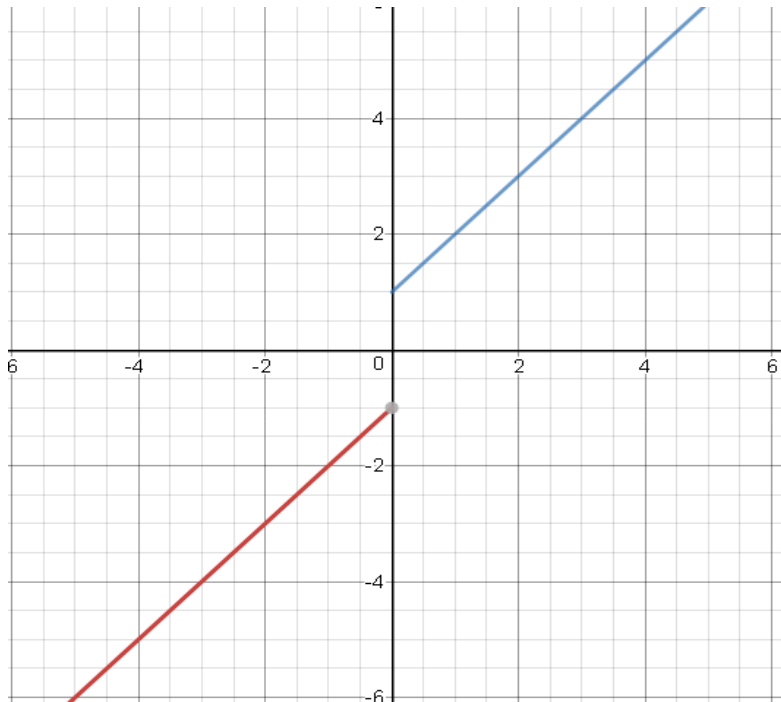# Survey of Calculus Unit I Practice Problems

1. Factor $11x^3 + 31x^2 - 6x$
2. Simplify $\sqrt{xx^2}$
3. Simplify $\left(\frac{x^3 y}{z^4}\right)^{-2}$
4. Find and simplify the difference quotient for $f(x) = 2x^2 + 3$
5. Give an example of a function that is not continuous at $x = 3$.

6. Given the following graph of f

   a. Find $\lim\limits_{x \to 2} f(x)$
   b. Find $\lim\limits_{x \to 0^-} f(x)$
   c. Find $\lim\limits_{x \to 0^+} f(x)$
   d. Is f continuous at $x = 2$?
   e. Is f continuous at $x = 0$?
7. Find the average rate of change of $f(x) = 3x^2 - x$ from $x = 2$ to $x = 5$.
8. Find the instantaneous rate of change of $f(x) = 3x^2 - x$ at $x = 2$.