

Practice Exam 1

Math 220

September 16, 2008

Name:

1. State the precise definition of the derivative and then use it to compute the derivative of $\frac{1}{x-2}$.

2. Given that $\lim_{x \rightarrow a} f(x) = 4$, $\lim_{x \rightarrow a} g(x) = 12$ and $\lim_{x \rightarrow a} h(x) = -3$, compute the following limits showing all your work or explain why they do not exist.

(a) $\lim_{x \rightarrow a} \frac{g(x) - h(x)}{f(x)}$

(b) $\lim_{x \rightarrow a} \sqrt{4 - f(x)}$

(c) $\lim_{x \rightarrow a} \frac{\sqrt{g(x) + h(x)}}{f(x)}$

3. Define what it means for a function to be continuous.

4. Determine the value of c which makes the function $f(x) = \begin{cases} 2x + c & : \text{ if } x \leq 3 \\ x^2 & : \text{ if } x > 3 \end{cases}$ continuous.

5. (a) Does the function $f(x) = x^2$ have an inverse? Why or why not?

(b) Find the inverse of the function $f(x) = \frac{x+2}{3x-2}$.

6. (a) State the Intermediate Value Theorem.

(b) Prove that the equation $x^7 + x + 3 = 5$ has a solution.

7. Compute $\lim_{x \rightarrow \infty} \frac{2x^2 - 1}{4x^3 - 5x - 1}$.