MATH 201 Exam II (2.4 - 2.8) Review

1. Know the precise (formal) definition of a limit.

Let f be a function defined on an open interval containing a, except maybe at a, and let L be a real number. Then

$$\lim_{x \to a} f(x) = L$$

means that for each $\epsilon > 0$ there exists a $\delta > 0$ such that $|f(x) - L| < \epsilon$ whenever $0 < |x - a| < \delta$.

2. Find a suitable delta such that the limit is proved. Examples:

(a) Find a suitable δ which proves that

$$\lim_{x \to 2}(3x - 2) = 4$$

(b) Find a suitable δ which proves that

$$\lim_{x \to 3} x^2 = 9$$

3. Know the intermediate value theorem and how to apply it. Example:

Show that the polynomial function $f(x) = x^3 + 2x - 1$ has a zero in the interval $[0, 1]$.

4. Know the definition of continuity at a point and on an open interval.

5. Describe the intervals on which a function is continuous.

6. Know how to evaluate infinite limits and limits at infinity, and find horizontal and vertical asymptotes.

7. Know the definition of derivative and how to find the derivative using the definition.

8. Know how to find the equation of the tangent line.

9. Know how to find the average and instantaneous rate of change of a function

Example exercises: Quiz; Homework questions; Ch. 2 Review: 25 - 28, 31 - 44, 47, 50; Ch. 3 Review: 2, 3, 7, 58