What to know for quizzes and exams

Definitions

(1) Rational number
(2) Contrapositive
(3) Converse
(4) Irrational number
(5) Upper bound / lower bound
(6) Bounded above / bounded below
(7) Supremum / infimum
(8) Absolute value
(9) (sequence) converges to L
(10) (sequence) is convergent
(11) (sequence) is divergent
(12) increasing / decreasing sequence
(13) strictly increasing / decreasing sequence
(14) monotone sequence
(15) diverges to ∞ or $-\infty$
(16) Subsequence
(17) Cauchy sequence
(18) Limit of a function
(19) Continuous at a point
(20) Continuous on an open interval
(21) Continuous on a closed interval
(22) Differentiable
(23) Derivative (at a point)
(24) Derivative (function)
(25) Increasing/decreasing function

Axioms/Theorems

(1) Well-ordering axiom
(2) Completeness axiom
(3) Theorem 7.1 (large natural numbers)
(4) Archimedean principle
(5) Density of rational numbers/ irrational numbers
(6) Triangle inequality
(7) Theorem 12.2 (limits and algebra)
(8) Squeeze Theorem
(9) Monotone convergence theorem
(10) Principle of induction
(11) Theorem 18.6 (convergence and subsequences)
(12) Theorem 19.2 (sequence with subsequences converging to every real number)
(13) Cantor's Theorem
(14) Bolzano-Weierstrass
(15) Main corollary of Bolzano-Weierstrass

(16) Cauchy if and only if convergent
(17) Theorem 25.1 (limits and sequences)
(18) Theorem 26.4 (limits of functions and algebra)
(19) Squeeze Theorem for functions
(20) Theorem 27.5 (continuity and limits)
(21) Theorem 28.1 (continuity and algebra)
(22) Theorem 28.3 (continuity and compositions)
(23) Intermediate Value Theorem
(24) Boundedness Theorem
(25) Extreme Value Theorem
(26) Derivatives and algebra (Theorem 32.9)
(27) Chain rule (Theorem 33.3)
(28) Min-Max Theorem
(29) Mean Value Theorem
(30) Increasing/decreasing functions and derivatives

Key skills

(1) Proving "if-then" statements, "for every" statements, "there exists" statements, "is unique" statements
(2) Proofs by contradiction
(3) Finding the negation of a statement
(4) Finding the contrapositive of a statement
(5) Using examples to prove/disprove statements
(6) Proving that a number is the supremum of a set
(7) Proving that a sequence converges to some value using the definition
(8) Algebra with limits of sequences: using these to determine if a sequence converges, and to what
(9) Using squeeze theorem to show sequences converge
(10) Relationship between boundedness, convergence, and monotonicity
(11) Proofs by induction
(12) Relationship between convergence/boundedness of sequences and convergence of subsequences
(13) Using the Cauchy property to show a sequence converges
(14) Using the $\varepsilon - \delta$ definition to compute limits
(15) Using algebra/squeeze theorem to compute limits
(16) Using the $\varepsilon - \delta$ definition to show continuity
(17) Using algebra/compositions to show continuity
(18) Applying the $\varepsilon - \delta$ definitions of limits and continuity
(19) Applying the Intermediate Value Theorem
(20) Applying Boundedness and Extreme Value Theorems
(21) Evaluating derivatives by definition
(22) Evaluating derivatives by algebra and chain rule
(23) Using definition of derivative and Min-Max Theorem to determine when values of f are larger / smaller than others
(24) Using definition of derivative and mean value theorem to determine increasing / decreasing behavior of functions