(1) Sets (chap 2)
  (a) Notation
    (i) listed set notation $\{1, 2, 3, 4\}$, $\{2, 4, 6, 8, \ldots\}$
    (ii) standard names ($\mathbb{R}$, $\mathbb{Q}$, $\mathbb{C}$, $\mathbb{Z}$, $\mathbb{N}$,ω, $\emptyset$)
    (iii) The magic word is "Let."
    (iv) intersect, union, complement, setminus
    (v) cardinality
    (vi) set builder – comprehension
    (vii) set builder – replacement
    (viii) $\in$ and $\subseteq$.
  (b) Direct proof by element chase.
  (c) Refutation by counterexample
  (d) Proof by contradition. (aesthetically worse.)
(2) Logic (chap 1)
  (a) The need for systematic logic.
    (i) to cast away doubt
    (ii) to make difficult linguistic calculations mathematical instead.
  (b) Topics of logic: and, or, not, implies, forall, exists.
  (c) Notations for logical operators.
  (d) Truth tables, including $\rightarrow$
  (e) Tautologies
(3) Sets 2 (chap 5)
  (a) Power set
(4) Cartesian products and relations (chap 3)
  (a) Cartesian products of two or more sets
  (b) cardinalities of cartesian products.
  (c) comparison to vectors.
  (d) relations
    (i) graphs of relations
    (ii) reflexivity, symmetry, transitivity
    (iii) equivalence relations
    (iv) modding out by equivalence relations
    (v) well definedness.
    (vi) partial orders.
    (vii) total orders.
(5) Functions (chap 4)
  (a) Syntax for evaluation: $f(x)$
  (b) Syntax for definition: Let $f : D \rightarrow R$ via $f(x) = \ldots$.
  (c) Domain
  (d) Range
  (e) Injectivity
  (f) Surjectivity
  (g) Bijectivity
  (h) Composition
  (i) Inverse
  (j) preimage and image.
(6) Infinity and induction
  (a) Induction
    (i) Fundamental principle of induction
    (ii) base case.
    (iii) Two expressions:
      (A) For contradiction, take least n with $\neg P(n + 1)$
      (B) $P(n) \rightarrow P(n + 1)$ with base case.
    (iv) Examples
      (A) Algebraic examples
      (B) $2^n \times 2^n$ checkerboard tiling (Golomb's proof. There's an applet.)
      (C) Leaves in a bag.
      (D) Interesting numbers
      (E) $8^n 3^n$ is divisible by 5. But factor!
  (b) Infinite sets, characterization via injections
  (c) Do infinite sets really exist?
  (d) Cardinality of infinite sets
  (e) Cantor's diagonalization.