

Math 111 Topics

Ch. 1: Linear Functions and Change

- Functions & function notation $y = f(x)$ - §1.1
 - Vertical line test
- Average rate of change - §1.2
- Increasing/decreasing graphs - §1.2
- Linear functions $f(x) = mx + b$ - §1.3 - 1.5
 - Equations of lines - §1.4
 - * Slope-intercept form $y = mx + b$
 - * Point-slope form $y - y_1 = m(x - x_1)$
 - * Standard form $Ax + By + C = 0$
 - Parallel and perpendicular lines - §1.5
 - Horizontal and vertical lines - §1.5

Ch. 2: More Functions!

- Evaluating functions/Solving equations - §2.1
- Domain & range - §2.2
- Piecewise-defined functions - §2.3
- Compositions - S 2.4
- Inverse functions - §2.4
- Concavity - §2.5
- Quadratic functions $f(x) = ax^2 + bx + c$ - §2.6
 - Solving quadratic equations by factoring or using the quadratic formula
 - Concavity of quadratic functions

Ch. 3: Exponential Functions ($f(x) = a \cdot b^x$ or $f(x) = a \cdot e^{kx}$)

- Increasing and decreasing by $r\%$ - §3.1
- Exponential growth versus linear growth - §3.2
- Graphs of exponential functions - §3.3
 - Horizontal asymptotes
- The number e - §3.4

Ch. 4: Logarithms

- Definition of logs - §4.1
 - $y = \log_a x = y \iff a^y = x$
- Common and natural log - §4.1
- Properties of logs - §4.1

- Solving exponential equations using logs - §4.1
- Using logs with exponential models (doubling time, half-life, etc) - §4.2
- Log functions and their graphs
 - Domain of a log function
 - Vertical asymptotes

Ch. 5: Transformations of Functions and Graphs

- Vertical and horizontal shifts - §5.1
- Reflections and symmetry (odd/even) - §5.2
- Vertical stretches and compressions - §5.3
- Horizontal stretches and compressions - §5.4
- Vertex form of a quadratic function - §5.5
 - Vertex formula: $x = -\frac{b}{2a}$

Ch. 8: More on Functions!!

- Decomposing a composition - §8.1
- Combinations of functions ($+$, $-$, \times , \div) - §8.3

Ch. 9: Polynomial and Rational Functions

- Power functions ($f(x) = kx^p$) - §9.1
- Polynomial functions
 - Long-run behavior - §9.2
 - Short-run behavior - §9.3
 - * Finding/plotting zeros of a polynomial
 - Rational functions
 - * Long-run behavior (Horizontal asymptotes?) - §9.4
 - * Short-run behavior - §9.5

Ch. 4 (Back of the Book): Finance

- Simple interest - §4.1
- Compound interest - §4.1
- Effective rates - §4.2
- Continuously compounding interest - §4.2
- Future value of an ordinary annuity - §4.3
- Present value of an ordinary annuity - §4.4