MATH 31B REVIEW SHEET
MIDTERM 1

Make sure to check CCLE for additional materials. Any handouts Prof. Aschenbrenner has given and any practice exercises will also be fair game for the exam.

All page numbers etc. are from Rogawski.

7.1: HW: 16, 20, 22, 21, 24, 26, 70, 72, 74, 92
Important examples: 2, 4, 5, 7, 8
Know: laws of exponents, domain and range of exponential functions (pp. 339-340)
definition of e, e^x is its own derivative (p. 342)
tangent slope interpretation of m(b) = ln(b) (p. 342)
derivative of e^(g(x)), e^(kx + b) (p. 343)
antiderivative of e^x (p. 343)
antiderivative of e^(kx + b) (p. 344)

7.2: HW: 2, 4, 8, 12, 26, 28, 30
Important examples: 2, 3, 4, 5, 7
Know: definition of inverse (p. 348)
definition of one-to-one (p. 349)
existence of inverses (p. 350)
horizontal line test (p. 350)
Derivative of inverse (Inverse Function Theorem) (p. 352)

7.3: HW: 30, 32, 54, 56, 86, 88
Important examples: 2, 3, 4, 7, 8, 9, 10, 11
Know: log properties (pp. 355-356)
change of base formula (p. 356)
derivative of an exponential (p. 357)
derivative of natural log (p. 358)
derivative of ln(f(x)) (p. 358)
log differentiation (p. 359)
antiderivative of 1/x (p. 360)
natural log as integral (p. 360)

7.4: HW: 8, 10, 34
Important examples: 2, 3, 4, 5, 6
Know: definition of exponential growth, growth constant (p. 364)
general solution of y' = ky, particular solution with initial condition y(0) = P_0 (p. 365)
conceptual insight: quantity grows exponentially if its rate of change is proportional to the amount present (p. 366)
definition of/formula for doubling time (p. 367)
definition of exponential decay (p. 367)
half-life definition and formula (p. 367)

7.5: HW: 27, 28
Important examples: 2, 3, 4
Know: definition of principal, balance, interest rate, and compounding frequency (p. 371)
compound interest formula (p. 372)
limit formula for e, e^x (p. 372)
continuously compounded interest formula (p. 372)
present value definition (p. 373)
present value of an income stream (p. 374)

7.6: HW: 2, 10
Important examples: 1, 2, 3
Know: general solution to y' = k(y - b) (p. 377)
cooling law differential equation (p. 377)
differential equation for free-fall with air resistance (p. 378)
annuity differential equation (p. 379)

7.7: HW: 2, 4, 8, 10, 18, 22, 32, 50, 66
Important examples: 2, 4, 5, 6, 7, 8, 10
Know: L'Hopital's rule (p. 383)
L'Hopital's rule for limits at infinity (p. 386)
e^x grows faster than x^n for all n (p. 386)

8.1: HW: 2, 4, 8, 10, 16, 20, 60, 64
Important examples: 1, 2, 3, 4, 5
Know: integration by parts formula (p. 413)
formula for integration by parts with definite integrals (p. 414)