

TERM TEST INFO SHEET

MAT135H1F - SUMMER 2015

Term test date and location: Monday, June 1 2015, 6-8pm at EX100.

Sections covered: 2.1-2.3, 2.5-2.8, 3.1-3.4. We assume that you are familiar with the prerequisites (working with logarithms, exponentials, trig. functions, inverses, etc.)

Extra office hours:

- Friday May 29, 10-1pm (BA6183) and 1-3pm (SS1078);
- Monday June 1, 10-1pm (BA6183) and 1-3pm (BA6183).

1. LIMITS

Keywords: definition of (one-and two-sided) limits; infinite limits (vertical asymptotes); Squeeze theorem; limits at infinity (horizontal asymptotes)

What to practice:

- (1) how to use the Squeeze theorem;
- (2) tricks to deal with limits of types $\frac{0}{0}$, $\infty - \infty$, $\frac{\infty}{\infty}$:
 - algebraic identities: $a^2 - b^2 = \dots$ and $a^3 - b^3 = \dots$
 - rationalizing;
 - dividing by the fastest growing term in the denominator.
- (3) finding horizontal/vertical asymptotes.

Solve all the problems numbered 3-24 in the review section of Chapter 2.

2. CONTINUITY

Keywords: definition of a function being continuous (at a point, on an interval); types of discontinuities; Intermediate Value Theorem.

What to practice:

- (1) finding roots using IVT;
- (2) make a piecewise defined function continuous.

3. DERIVATIVES

Keywords: tangent lines, velocity, acceleration; definition of the derivative at a point; "Every differentiable function is continuous."; examples of continuous but not differentiable functions; product rule, quotient rule, chain rule (!)

What to practice:

- (1) finding the derivative by using the definition and limits;
- (2) finding the equation of tangent lines;
- (3) finding the derivative using the rules of differentiation.

Solve all the problems numbered 7-50, 70-73 in Chapter 3.4.

Seriously, solve them all and you secured a good portion of your term test mark.

New important limits:

- (1) $\lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1;$
- (2) $\lim_{x \rightarrow 0} \frac{\cos(x) - 1}{x} = 0;$ (practice 39-44 in Chapter 3.3.)
- (3) $\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1.$

Useful to remember: all of these are special cases of

$$\lim_{x \rightarrow 0} \frac{f(x) - f(0)}{x} = f'(x).$$