Math 130 Day 40

Office Hours (LN 301/301.5): M 3:30-4:30, Tu 11:00-1:00, W 12:15-1:15, F 1:30-2:30. Other times by appointment. **Math Intern:** Sun through Thurs: 3:00–6:00, 7:00–10:00pm. **Website:** Use the links at the course homepage on **Canvas** or go to my course Webpage: `http://math.hws.edu/~mitchell/Math130F16/index.html`.

Review Material for the Exam.

1. Review Section 4.9. Practice antidifferentiation. Page 328–329 #59, 61, 65, 67–71 odd, 77, 85, 97, 107, 109, and 113. Read Chapter 5.1 to find out what lies ahead if you are taking Calculus II!

2. The **Final Exam** is cumulative. Use the labs and the previous tests and practice tests as a guide.

a) You should know the following definitions and how to use them: the definition of a continuous function, the limit definition of the derivative, the definition of an antiderivative, the definition of a horizontal or a vertical asymptote, the definition of a critical point.

b) Know all limit rules (and be able to do calculations including with conjugates, with trig functions, and limits at infinity). You should be familiar with the epsilon-delta definition of limit and how to use it. Know how to use l'Hopital's rule and when it applies (to which indeterminate forms).

c) Know all derivative rules including trig, inverse trig functions, natural log, (general) exponential functions, and the corresponding antiderivative rules. Know how to use logarithmic differentiation. Know how to use implicit differentiation.

d) Inverse functions: When do they exist? Review how we found the derivatives of $\arctan x$, $\arcsin x$ and $\ln x$ (as the inverse of e^x).

e) You should know (word for word) the MVT. You should know how to use the EVT, CIT, SCPT, IVT. You should know the relationship between differentiable and continuous functions.

f) Graphing, including vertical and horizontal asymptotes.

g) Initial value and motion problems (either as derivatives or antiderivatives, we will cover more of these in the last two classses), related rate problems, max-min problems (with justification).

h) The list above is probably 90% or more of the material on the final. But there may be something I have missed. See the previous exams and labs.

Optional: Calculus Final Review Session

From 10:30 to Noon on Monday, December 12 in Gulick 206A.

Class Work or Practice

Most of these are done in the online notes.

1. Suppose a ball is thrown with initial velocity 24.9 m/s from a roof top 132.3 meters high. The acceleration due to gravity is constant $a(t) = -9.8 \text{ m/s}^2$.

a) Find the velocity of the stone for $t \geq 0$.

b) Find the position of the stone for $t \geq 0$.

c) Find the time when it reaches its highest point (and the height).

d) Find the time when the stone hits the ground

2. A person drops a stone from a bridge. What is the height (in meters) of the bridge if the person hears the splash 5 seconds after dropping it?

3. **Extra Credit**: In the previous problem did you take into account that sound does not travel instantaneously in your calculation above? Assume that sound travels at 1120 ft/s. What is the height (in feet) of the bridge if the person hears the splash 5 seconds after dropping it?

4. A car is traveling at 90 km/h when the driver sees a deer 75 m ahead and slams on the brakes. What constant deceleration is required to avoid hitting Bambi? [Note: First convert 90 km/h to m/s.]

Math 130: Hand In Homework and WeBWorK. Name: ________________________

Set Day 40 due Tuesday. Optional: Set Day 40XC also due Tuesday.

1. For each of the following be sure to write out the original question. (Check your answer by differentiating.) Page 328–329:

a) #40

b) #50

c) #58

d) #102

e) #104

f) Page 332 #80 [Write the integrand in terms of sines and cosines and simplify first.]

2. Do Page 328

a) #70

b) #84 (Just find the position function.)

c) #92

3. A stone is thrown upward with an initial velocity of 48ft/s from the edge of a cliff 64ft above a river. (Remember: Using feet, acceleration due to gravity is -32ft/s^2.)

a) Find the velocity of the stone for $t \geq 0$.

b) Find the position of the stone for $t \geq 0$.

c) Find the time when it reaches its highest point (and the height).

d) Find the time when the stone hits the ground.