My Office Hours: M & W 2:30-4:00, Tu 2:00-3:30, & F 1:30-2:30 or by appointment. Math Intern: Sun: 2:00-5:00, 7:00-10pm; Mon thru Thu: 3:00-5:30 and 7:00-10:30pm in Lansing 310. Website: http://math.hws.edu/~mitchell/Math131F15/index.html.

Practice (Not to be handed in)

- 1. Read Chapter 5.1 on the Estimation of Areas under Curves. Key terms: regular partition, Riemann sum, left and right Riemann sums, summation (sigma) notation.
- 2. Review your notes, including the Area Properties.
- 3. Working with sigma notation: Page 344-45 #39, 41,
- 4. Review Lab 1 Answers Online.
- 5. Antiderivative practice (some were listed last time): Page 327–8, #17, 25, 37, 47, and 49 (see Example 6 on p. 324).

Hand In: Due Friday

- o. (*a*) Do the WeBWorK set Dayo2 (Due XX Night.) It covers summations and some integral and derivative reviews.(*b*) Finish the earlier WeBWorK assignments today.
- 1. Page 344 #40(a,d).
- 2. Use Theorem 5.1 to evaluate the following: Page 345 #42(b,d,g). Also see WeBWorK set Dayo2 #1-3.
- **3.** Use summation properties and formulæ (see Theorem 5.1) to evaluate the following general sums. Your answer will be in terms of *n*. [For part (c), square it first]. **Simplify all answers**. Also see WeBWorK set Dayo2 #4–6.

(a)
$$\sum_{i=1}^{n} \left(\frac{2i}{n}\right) \left(\frac{2}{n}\right)$$
 (b) $\sum_{i=1}^{n} \frac{i^2 - 10}{n^3}$ (c) $\sum_{i=1}^{n} \left(1 + \frac{i}{n}\right)^2 \left(\frac{1}{n}\right)$

4. Evaluate the following limits using your answers to #3. [Do not redo the work in #3]. Use proper limit notation.

(a)
$$\lim_{n \to \infty} \sum_{i=1}^{n} \left(\frac{2i}{n}\right) \left(\frac{2}{n}\right)$$
 (b) $\lim_{n \to \infty} \sum_{i=1}^{n} \frac{i^2 - 10}{n^3}$ (c) $\lim_{n \to \infty} \sum_{i=1}^{n} \left(1 + \frac{i}{n}\right)^2 \left(\frac{1}{n}\right)$

5. Chain rule review: Determine the derivatives of

(a) $f(x) = 3\tan^4 x$ (b) $g(x) = 6 + \ln(8x^5)$

- **6.** The population *P* of a bacteria colony grows at the rate $\frac{dP}{dt} = k\sqrt{t}$, where *t* is time in days. The initial population was P(0) = 500 and the population after 1 day was P(1) = 600. Find the population function P(t). (Review Lab 1, Problem #8 and its answer on line.)
- 7. Hand in Problem #12 on Lab 1. (Review Lab 1, Problem #11 and its answer on line.) Use the back of this sheet.

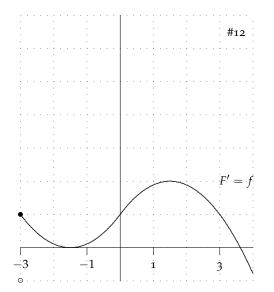
- **12.** Sometimes when we have no formula for a function we are forced to do graphical antidifferentiation. Let F(x) be the antiderivative of f(x) on [-3,4], where f is the function graphed below. Since F is an antiderivative of f, then F' = f. Use this relationship to answer the following questions.
 - (a) Where is F' positive? Negative? Use F' to determine the interval(s) where F increasing. Decreasing.

(b) At what x-value(s), if any, does F have a local max? Min?

(c) Determine where F'' is positive and negative. On what interval(s) is F concave up? Down?

(*d*) Does *F* have any points of inflection? If so, at which *x*-values??

- (e) Assume F passes through the point (-3, 1) indicated with a \bullet ; draw a potential graph of F.
- (f) Assume, instead, that F passes through (-3, -1) indicated by a \circ ; draw a graph of F.
- (g) What is the relationship between the two graphs you've drawn?



Math 131, Lab 1: Name: ___