Practice Problems
Math 113

These are some practice problems for Exam 2

ex.1. Solve the following problems from Chapter 9.
   (i) 3 (Prove that if \( f(x) = \sqrt{x} \), then \( f'(a) = 1/2\sqrt{a} \).)
   (ii) 11 ((a) Prove that Galileo was wrong; ...).
   (iii) 12 (Imagine a road on which the speed limit is specified at every single point. ...)
   (iv) 15 ( (a) Let \( f \) be a function such that at \( |f(x) \leq x^2 \).)

ex.2. Solve these problems from Chapter 10.
   (i) 7 ((a) A circular object is increasing in size in some unspecified manner, but it is known...)
   (ii) 9 (Particle A moves along the positive horizontal axis, ...)

ex.3. Solve these problems from Chapter 11.
   (i) 30 ( Suppose that \( f'(x) > g'(x) \) for all \( x \).
   (ii) 51 (what is wrong with the following use of l’Hospital Rule ...)
   (iii) 54(a) ( Prove that the following forms of l’Hospital’s Rule...)
   (iv) 66 ( Let \( f(x) = x^4 \sin^2 \frac{1}{x} \) for \( x \neq 0 \) and let ...)

ex.4. Solve these problems from Chapter 12.
   (i) 1 (ii) (Find \( f^{-1} \) for each of the following \( f \).
   (ii) 7(iv) (On which intervals \( [a, b] \) will the following function be one-one...)
   (iii) 9 (Suppose that \( f \) is a one-one function ...)
   (iv) 26 ( A function \( f \) is nondecreasing if \( f(x) \leq f(y) \) whenever...)

ex.5 Solve these problems from Chapter 13
   (i) 8(ii) (Find the areas of the regions bounded by..)
(ii) 6 (Prove that .. \( \leq 0 \) for all \( x > 0 \) )

(iii) 11(a) (Which functions have the property that every lower sum...)

(iv) 14 (Prove that .... The geometric interpretation should make this very plausible..)

(v) 18 (This problem outlines yet another way to compute...)

ex 6. Solve these problems from Chapter 14

(i) 7(i) (Use Problem 13-23 to prove that...)

(ii) 4(i) (Find \( f^{-1}(0) \) if...)

(iii) 19 (a) (Let \( f \) be integrable on \([a, b]\), let \( c \) be in \((a, b)\), and let ...)

ex. 7. Solve the following problems from Chapter 18.

(i) 1(v)

(ii) 5(v)

(iii) 6(iii)