

## Third Homework Assignment for Math 151H

### Due September 18

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For problems from the book, please indicate clearly the section and page number.

- Do these problems from §1.1:  
9, 10, 11, 14, 17, 20, 22, 24, 34, 36.
  - Do these problems from §1.2:  
1, 2, 21, 22, 28, 29, 35, 36, 38, 49, 50, 61, 62, 63.
  - Do these problems from §1.3:  
1, 4, 5, 8, 13, 21, 22, 40.
1. In class, when we showed the limit  $\lim_{x \rightarrow 3} x^2 = 9$ , we used the preliminary estimate of  $|x - 3| < 1$  to get that  $|x - 3| < \min(\frac{\epsilon}{7}, 1)$  is sufficient to force  $|x^2 - 9| < \epsilon$ . What bound would we get for  $|x - 3|$  if we used the preliminary estimate  $|x - 3| < 10$ ?
  2. Write down the precise  $(\epsilon - \delta)$  definition of limit.
  3. Use the  $\epsilon - \delta$  definition to show that  $\lim_{x \rightarrow 1} x = 1$ .
  4. Use the  $\epsilon - \delta$  definition to show that  $\lim_{x \rightarrow 1} 2x = 2$ .
  5. Use the  $\epsilon - \delta$  definition to show that  $\lim_{x \rightarrow a} x = a$ .
  6. Use the  $\epsilon - \delta$  definition to show that  $\lim_{x \rightarrow 0} bx = 0$ .
  7. Use the  $\epsilon - \delta$  definition to show that  $\lim_{x \rightarrow a} bx = ab$ .