Math 4031-1 Homework

1. The asterisked problems are due 1/23/08

Section 1.1: 3*, 4*, 5*, 10*

2. The asterisked problems are due 1/30/08

Section 1.2: 1, 4, 7*, 8*, 9*, 11, 14*, 15*

3. The asterisked problems are due 2/8/08

Section 1.3: 3, 4*, 5*, 8, 9*, 14*, 15, 18*

4. **Extra credit**: due 2/11/08

In the Archimedean ordered field of rational numbers, prove that the sequence

$$x_1 = 1, \quad x_{n+1} = \frac{x_n^2 + 2}{2x_n}, \quad n \geq 1,$$

is a Cauchy sequence.

5. The asterisked problems are due 2/15/08

Section 1.4: 1, 3*, 5, 7*, 10(a)*

Section 1.5: 1*, 5*, 8

6. The asterisked problems are due 2/22/08

Section 1.6: 1, 2*, 3*, 4*, 5, 8*, 9

Section 1.7: 2, 5, 6*, 8, 10

7. The asterisked problems are due 2/29/08

Section 1.8: 2, 3*, 4, 5*, 6*, 7*, 8

Exam (1) February 29, 2008 (Friday). Sections: 1.1–1.8

8. The asterisked and extra problems are due 3/10/08

Section 2.1: 4*, 5, 6*, 7, 11, 13*, 14, 15*

Extra: Use the ϵ-δ definition of limit to verify the assertion $\lim_{x\to 2} x^3 = 8$.

9. The asterisked problems are due 3/14/08

Section 2.2: 3, 4*, 5*, 7, 9*

10. The asterisked problems are due 3/31/08

Section 2.3: 1, 7*, 9*, 12, 13*, 15, 17, 19(b)*

11. The asterisked problems are due 4/7/08

Section 2.4: 2, 3*, 6, 7, 8*, 11*, 12*

12. **Extra credit**: due 4/11/08

Let $f : \mathbb{R} \to \mathbb{R}$ be a continuous function satisfying the equality

$$f(x+y) + f(x-y) = 2\big[f(x) + f(y)\big], \quad \text{for all } x,\, y \in \mathbb{R}.$$

Show that $f(x) = cx^2$ for some constant c.

13. The asterisked problems are due 4/14/08

Section 2.5: 1, 2*, 4*, 7, 10

Section 3.1: 3*, 4, 8*, 9*, 10, 11

14. The asterisked problems are due 4/21/08

Section 3.2: 2*, 3*, 7, 8, 11*, 12*

Exam (2) April 25, 2008 (Friday). Sections: 2.1–2.5, 3.1–3.2

15. **Extra credit** for the asterisked problems are due 4/30/08

Section 3.3: 2, 3*, 4, 5*, 6*

Section 3.4: 1, 4, 5, 6, 7

FINAL EXAM: May 9, 2008 (Friday). 3 to 5 pm, Lockett 119