Homework for Week 1   **Math 231 Fall 2001**

This homework will not be collected; it is your responsibility to do as many problems as necessary to understand the material. We recommend that you read each section before attempting any exercises. Next week's quiz will be a subset of the problems below.

Section 0.1 1, 2, 3, 5, 8, 11, 12, 13, 19, 24, 29, 30, 32, 33, 34, 37, 39, 40, 42, 45, 48, 50, 53, 60, 61, 65, 72, 73, 75, 76, 81, 82, 84, 85, 87, 88, 93, 94, 98.

Section 0.2 1, 2, 4, 6, 9, 11, 14, 15, 16, 18, 19, 21, 24, 26, 29, 32, 34, 36, 38, 39, 41, 45, 47, 49, 50, 53, 55, 59, 60, 62, 63, 65, 66, 71, 73, 77, 78, 79, 81.

Section 0.3 1, 3, 4, 5, 6, 8, 10, 11, 12, 13, 17, 18, 19, 22, 23, 25, 30, 32, 35, 37, 41, 45, 6, 47, 49, 53, 56, 57, 58, 60, 61, 65, 66, 69, 75, 77.

Section 0.4 2, 3, 5, 6, 10, 12, 13, 16, 17, 22, 23, 25, 27, 29, 30, 36, 37, 38, 43, 44, 49, 51, 52, 56, 57, 58, 61, 62, 64, 65, 68, 69, 71, 73, 77, 79, 83, 85, 86, 88, 89.

Selected Hints and Answers

Caution: The hints and answers below are not full solutions. Most of them would not be considered complete on a quiz or test.

Section 0.1
  8. Hint: Is 1.7 a rational number?
 12. Hint: Does 1.5 pass the "test" to be in the set?
 39. True.
 40. False.
 42. False.
 45. False.
 50. $\frac{-117}{10}$
 60. $\{x \mid x > 3 \text{ or } x < 2\}$
 73. $(-\infty, -2) \cup (-1, 3)$
 81. $-3b$
 85. Hint: Can you determine whether $ab - 1$ is positive or negative?
 87. 13
 93. length is $\sqrt{58}$, midpoint is $(-\frac{3}{2}, \frac{7}{2})$.

Section 0.2
 11. Hint: Is the equation true when $x = 1$ and $y = 4$?
 15. False.
 16. False.
 18. True.
 19. False.
 21. True.
 32. $(9x^2 + 1)(3x + 1)(3x - 1)$
 34. Hint: Look at the factoring formulas.
 47. $x = 0$, $x = -\frac{1}{2}$, and $x = 2$.
 59. $-x(x + 1)(x^2 + 1)$

Section 0.2 (continued)

66. $x = 0$ and $x = -2$ (the expression does not exist at $x = 1$).

77. $(t, u) = (-1, 0)$ and $(t, u) = (2, 3)$.

Section 0.3

10. $|r - 4| < 0.7$

32.   False.

35.   False.

37.   False.

49. $(-\infty, -3) \cup (-2, -1)$

56. $[-9, -7]$

60. $x \leq -2$ or $x \geq 2$, or in interval notation $(-\infty, -2] \cup [2, \infty)$.

69. $|3x + 5| \leq |3x| + |5| = |3||x| + |5| = 3|x| + 5$.

Section 0.4

10.   The statement $A \Rightarrow B$ is false only when A is true and B is false.

23.   "It is not true both that the stock market went up today and that Carrie refused to leave the house" is one initial translation. This is equivalent to the more sensible statement "Either the stock market did not go up today, or Carrie did not refuse to leave the house."

51.   These statements are not logically equivalent.

52.   These statements are logically equivalent.

57.   "There are some pickles that are not made with dill."

64.   "All cars have four-wheel drive."

68.   The converse is "If Alina is uncomfortable then she is wearing wool or denim." The contrapositive is "If Alina is comfortable then she is not wearing wool or denim."

77.   The converse is $C \Rightarrow (A$ and $B)$, and the contrapositive is $\text{Not}(C) \Rightarrow \text{Not}(A$ and $B)$.

83.   Linda wears a red hat, Alina wears a blue hat, Phil wears a green hat, and Stuart wears a yellow hat.

88.   Drin and Evan are liars, and Franny tells the truth.