Mathematics 300, Spring 2008—Section 06 Instructor: H. J. Sussmann

HOMEWORK ASSIGNMENTS

HOMEWORK NO. 1, due on Monday, February 4:

- (I) Book, Page 9, Problem 5 (nonstarred items);
- (II) Book, Page 10, Problem 8 (nonstarred items),
- (III) Book, Page 10, Problem 9 (nonstarred items),
- (IV) Book, Page 17, Problem 1 (nonstarred items);
- (V) Book, Page 18, Problem 4 (nonstarred items);
- (VI) Book, Page 18, Problem 5 (nonstarred items);
- (VII) Book, Page 27, Problem 5 (nonstarred items);
- (VIII) Book, Page 27, Problem 6 (nonstarred items);
 - (IX) Book, Page 27, Problem 7 (nonstarred items).

HOMEWORK NO. 2, due on Monday, February 11:

- (I) Book, Page 37, Problem 5 (nonstarred items);
- (II) Book, Page 38, Problem 9,
- (III) Book, Page 38, Problem 11 (nonstarred items);
- (IV) Book, Page 46, Problem 12 (nonstarred items);
- (V) For each of the following six equations, prove that there exist integers m, n that satisfy the equation, or prove that m, n do not exist.

1)	$m^2 + n^2$	=	16,
2)	$m^2 + n^2$	=	15,
3)	$m^2 - n^2$	=	28,
4)	$m^{2} - n^{2}$	=	29,
5)	$m^2 - n^2$	=	30,
6)	30m + 25n	=	1.

HOMEWORK NO. 3, due on Monday, February 18:

- (I) Book, Page 46, Problem 10,
- (II) Book, Page 46, Problem 11,
- (III) Book, Page 53, Problem 1 (nonstarred items);
- (IV) Book, Page 53, Problem 5 (nonstarred items);
- (V) Book, Page 53, Problem 8 (nonstarred items);
- (VI) Prove that there exist integers m, n such that $m^2 + n^2 = 3,402,523$

or prove that m and n do not exist. (*Hint*: Use the Division Algorithm for m and n with b = 4.)

(VII) Prove that $\sqrt{2} + \sqrt{5}$ is irrational.

HOMEWORK NO. 4, due on Monday, February 25:

- (I) Book, Pages 65 to 67, Problems 6, 8, 10, and 12 (nonstarred items only);
- (II) Using the Well Ordering Principle, prove that $(\forall n \in \mathbb{N})(3|n^3 n)$.