NUMBER-THEORY EXERCISES, II.IV

DAVID PIERCE

These exercises involve quadratic Diophantine equations.

Exercise 1. Solve

$$2x^2 + 2xy + y^2 = 25.$$

Exercise 2. Solve

$$9x^2 + 6xy + 2y^2 = 17.$$

Exercise 3. Solve (if you can!)

$$121x^2 + 304xy + 191y^2 = 37.$$

(If nothing else works, try letting $3x + 4y = u$ and $4x + 5y = v$.)

Exercise 4. Solve

$$4x^2 + 2xy - y^2 = 44.$$

Exercise 5. Concerning

$$8x^2 + 4xy - y^2 = m :$$

(a) solve when $m = 8$;
(b) solve when $m = 44$;
(c) find all m for which the equation is soluble, where $0 < m < 44$.

Mathematics Dept, Middle East Tech. Univ., Ankara 06531, Turkey
E-mail address: dpierce@metu.edu.tr
URL: http://www.math.metu.edu.tr/~dpierce/courses/366/

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