

SIXTH TUTORIAL ASSIGNMENT

DATE TO DISCUSS: FEBRUARY 11 (TUTORIAL 1), FEBRUARY 25 (TUTORIAL 2)
DUE: MARCH 4 (TUTORIAL 1), MARCH 11 (TUTORIAL 2)

The following problem is called **Square Bashing** from Thinking Mathematically Second Edition p. 175.

Take any numbers satisfying a pattern of the form

$$4^2 + 5^2 + 6^2 = 2^2 + 3^2 + 8^2 .$$

Pair up the left and right numbers in any way at all, for example 42, 53, 68. Notice then that

$$42^2 + 53^2 + 68^2 = 24^2 + 35^2 + 86^2$$

Why? Explain if such a manipulation will work for other types of pairings, when it will work and why.

Examples:

with more than three squares?

$$1^2 + 4^2 + 6^2 + 7^2 = 2^2 + 3^2 + 5^2 + 8^2$$

with sums of three digits?

$$1 + 4 + 6 = 2 + 3 + 6$$

with sums of 3 cubes (some may or may not be 0)?

$$3^3 + 4^3 + 5^3 = 0^3 + 0^3 + 6^3$$

with sums of four digits?

$$1 + 4 + 6 + 7 = 2 + 3 + 5 + 8$$

with sums of three two digit squares?

$$42^2 + 53^2 + 68^2 = 24^2 + 35^2 + 86^2$$