

Math 112-40, Mr. Church, Homework 8

Due at the beginning of class on Wednesday, November 11.

Please staple your homework.

- Find the prime factorizations of the following numbers, then use them to compute the gcd and the lcm of each pair of numbers.
 - 81 and 72
 - 75 and 60
 - 75 and 70
 - $2^2 \cdot 3^2 \cdot 5^2 \cdot 7$ and $2 \cdot 3^3 \cdot 5 \cdot 11$ [see footnote¹]
- Find a pair of numbers, with neither number a multiple of the other, whose lcm is 15.
 - Show that this is the only such pair of numbers (that is, part (a) has only one answer).
 - Find two *different* pairs of numbers, with neither number a multiple of the other, whose lcm is 12.
 - Explain in 1–2 sentences what properties of the numbers 15 and 12 account for this difference [only one answer vs. multiple answers].
- Exercise 6.1 (but only find 3 integers, at least one of them negative, for each part).
- Which of the following pairs of integers are congruent modulo 5? Which are congruent modulo 6?
 - 4 and 13
 - 5 and 1005
 - 2 and 77
 - 24 and 6
- Find all the integer solutions to the equation

$$2x \equiv 6 \pmod{10}.$$

There are infinitely many solutions; don't forget the negative solutions.

- Find all the integer solutions to the equation

$$2x \equiv 8 \pmod{13}.$$

¹you don't have to simplify this one, you can leave the answers in terms of their prime factorizations