MATH 232 Discrete Math
Homework 3

Basic Information
This assignment is due in Gradescope by 10 PM on the dates below.

Make sure you understand MHC honor code and have carefully read and understood the additional information on the class syllabus and the grading rubric. I am happy to discuss any questions or concerns you have!

You are always welcome to ask me for small hints or suggestions on problems.

Problems

Reading Problem 3M (Due: Sunday, September 21)

You will read about the Division Algorithm and greatest common divisors (GCD) for Monday's class. Fill in the following table (it is also on page 415 of MR):

a	b	gcd(a,b)	Remainder r	gcd(b,r)
44	12			
75	21			
50	33			

Wednesday Problems HW3 (Due: Wednesday, September 24)

For problems 1-6 prove or disprove each of the following statements. Be sure to use the techniques and proof-writing guidelines we have talked about in class.

1. For all $x \in \mathbb{R}$ we have $x^2 + 1 = (x + 1)^2$.

2. There exists an integer n so that $n > 3$ and $n < -5$.

3. There exists an $x \in \mathbb{Z}$ so that for all $y \in \mathbb{Z}$ we have $y^2 > x$.

4. For all $y \in \mathbb{Z}$ there exists an $x \in \mathbb{Z}$ such that $x + y = 0$.

5. If x is an odd integer and y is an odd integer, then $x + y$ is an even integer.

6. Suppose a, b, and c are integers. If $a \mid b$ and $a \mid c$ then $a \mid (b + c)$

7. Prove the following statement by (a) writing down its contrapositive and then (b) proving the contrapositive.

Let $a \in \mathbb{Z}$. If $3a + 2$ is odd then a is odd.

Reading Problem 3F (Due: Thursday, September 25)

Find an example of functions f and g so that $g \circ f$ is surjective, and g is surjective, but f is not surjective. Your example can be ANY functions f and g. (This is one of the example mentioned on page 333 of MR.)