Sample outline for problem set 01
Math 127

Definitions: The definitions you should copy from the class notes/text are: (2.1) Divides, divisor; associates, up to associates. (2.2) Common divisor; greatest common divisor. (2.3) Floor.

Note that you do not need to copy theorems from the text for the outline; in fact, I prefer that you don't, though I won't take off points for it.

Below: **A**= Assume, **C**= Conclude.

2.1.1(a). **A**. d divides n.

(stuff)

C. $-d$ divides n.

2.1.1(b). **A**. d divides n.

(stuff)

C. d divides $-n$.

2.1.3. **A**. $d, a, b \in \mathbf{Z}$.
A. d divides b.

(stuff)

C. d divides ab.

2.2.2.

(a) **A**. d, q, a positive integers, $a = dq$, $d \leq q$.

(stuff)

C. So $d \leq \sqrt{a}$.

(b) Explain why number of divisors of a is $\leq 2\sqrt{a}$.

(c) Revise Naive Algorithm for GCD so it takes $\leq C\sqrt{n}$ steps.

2.3.4(a). Exploration: Find a and d such that there are at least two possible q and r that satisfy (2.3.5).

(b) Exploration: Find condition on a and d that describes when q and r are not unique.

2.4.1(c,e). Apply Euclidean Algorithm to compute GCDs.

2.4.2(b,f). Apply Signed Euclidean Algorithm to compute GCDs.