Mathematics 300 Homework, October 11, 2017.

Read Chapter 6, Pages 111–117. He does a good job of explaining how proof by contradiction works and has some nice examples.

For homework do Problems 1 (which I think we have done before), 3 5 (for this one you can use the fact we proved in class today, then if a is an integer and $3 \mid a^2$, then $3 \mid a$), 7, 9.

Here are two problems to be turned in.

1. The number $\dfrac{1+\sqrt{2}}{1-\sqrt{2}}$ is irrational.

2. Let n be an integer with $n \geq 2$. Let d be the smallest integer $d > 1$ which is a factor of n. Show that d is prime. *Hint:* Towards a contradiction assume d is not prime, then d has a factor a, with $1 < a < d$ and $a \mid d$. Then show $a \mid n$ and that this gives a contradiction.