Lecture 13
Feb. 2nd, 2015

Chapter 7 problem 5 (c) & (d)
n is $\mathbb{E}$ prime iff it is not divisible by any (even) numbers
example: 2, 6, 10, 14, 18, 22, 26, 30 ...
which are the products of 2 and odd number...

$180 = 2^2 \cdot 3^2 \cdot 5$
$180 = k_1 \cdot k_2$
$k_1 = 2^{x_1} \cdot 3^{y_1} \cdot 5^{z_1}$
$k_2 = 2^{x_2} \cdot 3^{y_2} \cdot 5^{z_2}$
$x_1 + x_2 = 2$
$y_1 + y_2 = 2$
$z_1 + z_2 = 1$

2 has to be in k_1 and k_2 each
then we divide two 3's and one 5 into two groups, that's 3 choose 2.

problem 7.6 (b)
$\mathbb{M} = \{m : m \equiv 1 \bmod 4\}$
m $\mathbb{M}$-divides n if $n = mk$ for $k \in \mathbb{M}$
n is an $\mathbb{M}$-prime if the only $\mathbb{M}$-divisions are 1 & n.

1, 5, 9, 13, 17, 21, 29
$3 \equiv 3 \bmod 4$
$7 \equiv 3 \bmod 4$

$n \in \mathbb{M}$ s.t. $n = k_1 \cdot k_2 = k_1' \cdot k_2'$
$\mathbb{M}$-prime is ⊛ either a prime or $a \cdot b$ where $a \equiv b \equiv 3 \bmod 4$

Note: if $x \equiv 3 \bmod 4$, $y \equiv 3 \bmod 4$, then $x \cdot y \equiv 9 \equiv 1 \bmod 4$

if ⊛ holds for n, then the only factorization of n is $n = 1 \cdot n$

$x \equiv 3 \bmod 4$: $S = \{3, 7, 11, 15, 19, 23, 27 \ldots\}$
We want $k_1, k_2 \in S$, $k_1', k_2' \in S$, s.t. $k_1 \cdot k_2 \equiv k_1' \cdot k_2'$