Rec 9/3

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$$G = \bigcup_{1}^{n} x_i H$$

$$x_i = g_i^1 \cdots g_i^{l_i}$$

$\langle a^2, b^2 \rangle \leq \langle a, b \rangle$
is finitely gen, infinite index.

mult. by g^{-1}

$$\bigcup \underbrace{g x_i}_{} H$$

$$Hg_1H \neq Hg_2H$$

$$\Rightarrow \exists \tilde{h} g_1 h' \in Hg_1H \setminus Hg_2H$$

if $\tilde{h}_1 g_1 h_1' = \hat{h}_2 g_2 h_1'$

Qual Prep

smallest prime dividing n.

If $|G| = n$ and $[G:H] = p$ then H is normal

Schrier's Lemma

Let $\langle S \rangle = G$, (S finite)

$$G = g_1 H \cup g_2 H \cup \cdots \cup g_n H \qquad g = \{g_1, \dots, g_n\}$$

$$\langle g^{-1} S \rangle \neq H$$

$$\langle \{ g^{-1} S g \} \rangle \nsubseteq H$$

$$H \supseteq T = \{ h \in H : g_j s_i g_k^{-1} = h \} \ ?$$
$$\exists s_i, g_j, g_k$$

U^j = set of elements of G that can be written as products of at most j elts of S.

$V^j =$ " H "

T

$U^n \subseteq \{g_1, \dots, g_n\} V^m$