April 28

Last the: splitting field Today: Finis prot of uniqueness hexagon inscibling a circle

Let K be a fall Then JJF: L-12' such that Let fly eK[x] Fla)= rla) VaEK. Defo We say that K<L Micture: L-FJ- L' is a <u>splitting field</u> if splithing V Field of K OT Absume off SEKLY K Splits in L'  $D f(x) = a_n(x-a_i) - (x-a_i)$ where dit L (i.e flx) spits  $D L = K [dy - , d_d]$ Voost: Write f(x)=ao(x-di)- (x-dd) They (Existence) For any K and f(x) EK[x], J splitting where diEL. It all ditle, then K=L & can take F = TOthomia, let 2 be a not of fla) not in K. Then I run poly gla) field. Prop [Univ. property of splitting fled . Let K CL be the splitting fled of fled EKEN. for 2. A Know glx) irrel and f[x]=g(x)hlx) frome · Let K J L' be another Consider K C K [x](f) Held extension such that O(F)(L)[] splits

Prop I Ulriv. property of splitting Subly ~ Know glad irrel end flat-glath · Let K CL be the splitting Consider K C K [x Red of flat HLL. ·Let K 5) L'be another Held extension such that O(F)(L) Splits Then JJ: L-12' such Hat Fla)= 5(a) VaEK. Picture: L-FJ-2/ Schild of V Falto K TAscene olf splits in L' Voot: White f(x)=ao(x-di)- (x-dd) where dith. It all ditle, then K=L & can take 'F=J Othorwa, let 2 be a not of fla) not hik. Then I run poly gla) for 2.

and f[x]=g(x)hlx) from Consiler K C K[x]/lg) = V(2) isila Picture U  $\frac{1}{V} = \frac{1}{V} \left[ \frac{1}{V} \right]$ Prost by induction on 12:121. Goal: Extend of to of This sections by rising induction since 12-116-11 2 12-14 and L splitting flold of Hert & KbilkJ. ~ o Constanting of: Let's clatre K[x] ~ L' Since glf = g(x) has a not BEL Define  $\gamma(x) = \beta$  or  $\gamma(g(x)) = g(\beta)$ Then  $\ker \psi = g(x)$ 

A Know glx) irred and f(x)=g(x)hlx) frome Consider K < K[x]/lg) = V(2) Picture  $K(\lambda) = |(X)|_{g}$ Prost by induction on 12:121. Goal- Extend of the of This sections by rising induction since 12-16/1 2 12-12 and L splitting Rold of YLX) & KLDICXJ. ~ ~ ~ Constanting o' Let's clatre K[x] ~ L' Since glf = g(x) has a not Bell Define  $\gamma(x) = \beta$  or  $\gamma(g(x)) = g(\beta)$ Then Kern = gla)

FS-ally, gives  $\chi[x] \xrightarrow{\gamma} 1!$ Jol since gehelle

Prop [ Univ. property of splitting steld · Let K CL be the splitting Red of fly HKG. ·Let K 5) L'be another Held extension such that o(F)ELIS sptits Then JJ: L-12' such that Fla)= rla) VaEK. Picture: L-FJ- L' Sdilling V Held of L 'Ascene off splits in L' SEKLY K Iron Uniquerers) Let S: K-1K' isom of fields Let FLXIEKCZ & f'EXCZ it inage

If KCL splitting field of f and KICLI in fi then Jikom J'L-1L' exterling J. Picture: L-J-NL KJK Karle In special care K=K1 shows uniquentos of splitty had F: Propertiles gives  $\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}} \frac{1}{\sqrt{$ -J-K So we have I Just need to show it's an ison. But we know J=2-2L' is injectly  $\rightarrow [L':K] > [L:K]$ But it's symmetry [31:K] Same argument applied to g': K'-)K gives []: K[=]L': K] ヨールシン ヨレジン

Next topics · normal extrasory Say KCL normal Addect IF Y FEKEX such Hart f(x) has some not in L, then f(x) splits over L. Krop: Splikting fiddes are vorhail. · Fields in char=p & frite fulls.

reash a HWJ Trisecting 90° argle 13-1 も 60° 30 TSh 5.50 Since it's a square nout it doesn't vimply a contraction exist m p = (a,b)abt QLDd dt 1/ (Huger bod It's prive to commut p as 30 interactor point usy merlanger.