where $\mathfrak{D}_i$ is* the relative discriminant of K_{i-1} with respect to K_i. The field K is of degree $\epsilon = e^{(1)} \cdot e^{(2)} \cdots e^{(t)}$ with respect to F_2 and by the last reference

$$D = d^\epsilon N(\mathfrak{D}),$$

where $\mathfrak{D}$ is the relative discriminant of K with respect to F_2. By the Lemma, every $N(\mathfrak{D}_i) > 1$. It follows that $N(\mathfrak{D}) > 1$. But, by a result due to Chevally, h_2 divides h_1 if there is no field K, $F_1 \geqq K > F_1$, such that the relative discriminant of K with respect to F_2 is of norm unity.† The theorem follows.

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SOME APPLICATIONS OF MURPHY'S THEOREM‡

BY H. BATEMAN

It is well known that the linear partial differential equations of mathematical physics possess solutions in the form of definite integrals with limits depending on the variables entering into the partial differential equations. The law connecting the limits of such an integral with the integrand looks at first sight rather mysterious but the whole matter becomes clear when the integral is expressed as a contour integral with the aid of a theorem due to Murphy and, in a slightly different form, to Cauchy.§

If C is a closed contour containing just one root, a, of the equation $F(x)=0$ and just one root, b, of the equation $G(x)=0$, then, if the radii from these roots turn completely round just once and in one direction as a point describes this contour and if the functions $f(z)$, $\int f(z)dz$, $F(z)$, and $G(z)$ are analytic and uni-

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* Bachmann, loc. cit., p. 452.

† Chevally, *Relation entre le nombre de classes d'un sous-corps et celui d'un sur-corps*, Comptes Rendus, vol. 192 (1931), pp. 257–258.

‡ Presented to the Society, December 27, 1932.

§ R. Murphy, Transactions of the Cambridge Philosophical Society, vol. 3 (1830), p. 429, A. L. Cauchy, Journal de l'École Polytechnique, vol. 12 (1823), p. 580. Murphy's integral has been transformed into a contour integral from which Cauchy's relation may be obtained by an integration by parts.