GOLDEN OAK RESEARCH

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Standard Income Table:

Low (L)	High (H)		Midpoint (I)	Range (R)
\$0	\$10,000		\$5,000	\$10,000
\$10,000	\$14,999		\$12,500	\$4,999
\$15,000	\$19,999		\$17,500	\$4,999
\$20,000	\$24,999		\$22,500	\$4,999
\$25,000	\$29,999		\$27,500	\$4,999
\$30,000	\$34,999		\$32,500	\$4,999
\$35,000	\$39,999		\$37,500	\$4,999
\$40,000	\$44,999		\$42,500	\$4,999
\$45,000	\$49,999		\$47,500	\$4,999
\$50,000	\$59,999		\$55,000	\$9,999
\$60,000	\$74,999		\$67,500	\$14,999
\$75,000	\$99,999		\$87,500	\$24,999
\$100,000	\$124,999		\$112,500	\$24,999
\$125,000	\$149,999		\$137,500	\$24,999
\$150,000	\$199,99		\$175,000	\$49,999
\$200,000	\$275,000		\$237,500	\$75,000

Definition: Suppose $f \epsilon C^1[a, b]$. Let the Income $I_0, \dots, I_n$ be distinct numbers in $[a, b]$ However, since the range of the grouped frequencies are not uniform, we must map $f(I) \rightarrow \omega(I)$:

$$\omega = f(I_i)\left(\frac{\mathrm{m}}{R_i}\right) \; where, \mathrm{m} = \min(R)$$

Definition: Now suppose $\omega \epsilon C^1[a,b]$. Let the Income $I_0, \dots, I_n$be distinct numbers in $[a,b]$, such that the Hermite polynomial $P(I)$ and approximates ω.

$$P(I_i) = \omega(I_i), \quad for\ i = 0, \dots, n$$

$$\frac{dP(I_i)}{dI} = \frac{d\omega(I_i)}{dI}, \quad for\ i = 0, \dots, n$$

Theorem: if ω $\omega \epsilon C^1[a,b]$ and partitioned into N Intervals $I_0, \dots, I_n \ \epsilon[a,b]$ district numbers the Hermite polynomial is:

$$H_{2n+1}(I) = \sum_{j=0}^{N} \omega(I_j)\, H_{n,j}(I) + \sum_{j=0}^{N} \omega'(I_j)\, \widehat{H}_{n,j}(I)$$

$$Where,\ H_{n,j}(I) = \left[1 - 2(I - I_j)\, L'_{n,j}(I_j)\right] L_{n,j}^2(I)$$

$$\widehat{H}_{n,j}(I) = (I - I_j) L_{n,j}^2(I)$$