UNIVERSIDAD AUTONOMA DE AGUASCALIENTES

DEPARTAMENTO DE MATEMÁTICAS Y FÍSICA

Materia: **CALCULO INTEGRAL**

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Tarea Mini Examen 2 Periodo Parcial 1

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Carrera: ICI 2-A

Mini Examen 2

① Usando sumas especiales, calcule el valor de la suma dada por: $\sum_{i=6}^{54} (9i + (-8))^3$

$$\sum_{i=6}^{54} (9i - 8)^3 = 729i^3 - 1994i^2 + 1728i - 512$$

$$= 729 \sum_{i=6}^{54} i^3 - 1994 \sum_{i=6}^{54} i^2 + 1728 \sum_{i=6}^{54} i - \sum_{i=6}^{54} 512$$

$$= \frac{729\, n^2(n+1)^2}{4} - \frac{1994\, n(n+1)(2n+1)}{6} + \frac{1728\, n(n+1)}{2} - 512(n)$$

$$= \sum_{i=1}^{54} (9i-8)^3 - \sum_{i=1}^{5} (9i-8)^3$$

$$= \left[\frac{729(54)^2(55)^2}{4} - \frac{1994(54)(55)(109)}{6} + \frac{1728(54)(55}{2} - 512(54)\right]$$

$$- \left[\frac{729(5)^2(6)^2}{4} - \frac{1994(5)(6)(11)}{6} + \frac{1758(5)(6)}{2} - 512(5)\right]$$

$$= \left[\frac{729(2916)(3025)}{6} - 107,586,270 + 2566,080 - 27648\right]$$

$$- 113,850 - 658,020 + 26,370 - 2560$$

$$= 150517847 2$$

② Calcule la integral indefinida que se muestra

$$\int (\operatorname{sen}(8x))^4 (\cos(8x))^3 \, dx$$

$u = 8x$

$du = 8\,dx$

$dx = \frac{1}{8}\,du$

$$= \frac{1}{8}\int \operatorname{Sen}^4(u)\cos^3(u)$$

$$= \frac{1}{8}\int \cos(u)(1-\operatorname{Sen}^2(u))(\operatorname{Sen}^4(u))$$

$$= \frac{1}{8}\int \cos(u)(-\operatorname{Sen}^4(u)(\operatorname{Sen}^2(u)-1))$$

$w = \operatorname{Sen}(u)$

$dw = \cos(u)$

$dx = \frac{1}{\cos(u)}\,dw$

$$= -\int w^4(w^2-1)\,dw$$

$$= \int w^6 - w^4\,dw$$

$$= \frac{w^7}{7} - \frac{w^5}{5}$$

$$= \frac{\operatorname{Sen}^5(u)}{5} - \frac{\operatorname{Sin}^7(u)}{7} = \frac{1}{8}\left[\frac{\operatorname{Sin}^5(u)}{5} - \frac{\operatorname{Sin}^7(u)}{7}\right]$$

$$= \frac{\operatorname{Sen}^5(u)}{40} - \frac{\operatorname{Sin}^7(u)}{56} = \frac{\operatorname{Sen}^5(8x)}{40} - \frac{\operatorname{Sen}^7(8x)}{56} + C$$