

1. (30 points) Realizar cada uno de los siguientes ejercicios de refuerzo matemático.

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|---|---|--|
| (a) $\int t \cos(3t^2) dt$ | (k) $\int \frac{dx}{x^2 - a^2}, \text{ para } a \neq 0$ | (s) $\sum_{k=2}^6 \cos 0.5k$ |
| (b) $\int \frac{t \sin(4t + 6\pi)}{3\pi} dt$ | (l) $\int (nx)^{\frac{1-n}{n}} dx$ | (t) $\sum_{s=4}^{10} 3s$ |
| (c) $\int e^{\pi t + 3\frac{\pi}{4}} \sin(\pi t) dt$ | (m) $\int 3^x e^x dx$ | (u) $\sum_{x=1}^6 (2x)^2$ |
| (d) $\int 4t^{2n} dt$ | (n) $\sum_{k=0}^{100} \left(\frac{1}{3}\right)^k$ | (v) $\sum_{y=5}^n y^2$ |
| (e) $\int t \sin(t) \cos(3t) dt$ | (o) $\sum_{n=0}^8 1^n$ | (w) $\sum_{k=0}^{\infty} 2(0.5)^{2k}$ |
| (f) $\int \frac{1}{3\Omega - 2} d\Omega$ | (p) $\sum_{n=-2}^4 0.5^n$ | (x) $\sum_{k=a}^{\infty} 3\left(\frac{1}{4}\right)^k$ |
| (g) $\int \sin^2 \theta d\theta + \int \cos^2 \theta d\theta$ | (q) $\sum_{k=5}^{10} 9^{0.5k}$ | (y) $\sum_{n=0}^{\infty} \frac{2n}{3} (0.2)^n$ |
| (h) $\int x dx$ | (r) $\sum_{k=0}^5 4e^{3k}$ | (z) $\sum_{n=0}^{\infty} n^2 \left(\frac{1}{3}\right)^n$ |
| (i) $\int (x^2 - 1)10^{-2x} dx$ | | |
| (j) $\int \frac{dx}{x\sqrt{1-x^2}}$ | | |

2. (5 points) Resolver las inecuaciones:

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|-------------------------|---------------------------|---|---|
| (a) $1 - x \geq 2x + 3$ | (c) $0.2x + 4 > 1.7x - 3$ | (e) $(x - 4)(x + 3) < 0$ | (g) $\frac{4 - x}{3x^2 + 3x - 60} \geq 0$ |
| (b) $5x - 4 < 3x + 4$ | (d) $-1.4x \leq 28$ | (f) $\frac{x^2 - 5x + 6}{x + 4} \leq 0$ | (h) $x^3 + 8 > 0$ |

3. (10 points) Simplificar las expresiones (eliminando las partes irracionales del numerador o denominador, mediante identidades trigonométricas):

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| (a) $\left(\frac{1-x}{1+\sqrt{x}} + 2\sqrt{x}\right)(1-\sqrt{x})$ | (c) $\left(\frac{1}{(\sqrt{x}-1)^2} - \frac{\sqrt{x}}{1-x}\right)\frac{1-x}{1+x}$ | (e) $\sin^2 x - \sin^4 x + \cos^4 x$ |
| (b) $\left(\frac{1}{\sqrt{x}+3} + \frac{4}{x-9}\right)\frac{\sqrt{x}+3}{\sqrt{x}+1}$ | (d) $\frac{\sqrt{x}}{\sqrt{x}-6} - \frac{3}{\sqrt{x}+6} + \frac{x}{36-x}$ | (f) $\frac{\sin^2 \alpha}{1 - \cos \alpha} - \cos \alpha$ |

4. (5 points) Demostrar la igualdad implementando propiedades trigonométricas:

- (a) $\sin^4 \alpha + 2 \sin^2 \alpha \cos^2 \alpha = 1 - \cos^4 \alpha$