# RESOLVIENDO PROBLEMAS DE MATEMÁTICA

## RESOLUCIÓN DE LOS PROBLEMAS PROPUESTOS

**PROBLEMA 151 (100118)**

Resuélvase la integral triple

$$\int_0^1 dx \int_0^1 dy \int_0^1 \frac{dz}{\sqrt{x+y+z+1}}$$

**RESOLUCIÓN:**

$$\int_0^1 \frac{dz}{\sqrt{x+y+z+1}} = 2\left(z+(x+y+1)\right)^{\frac{1}{2}}\Big|_0^1 = 2(\sqrt{x+y+2}-\sqrt{x+y+1})$$

$$\int_0^1 2(\sqrt{x+y+2}-\sqrt{x+y+1})dy = 2.\frac{2}{3}(y+(x+2))^{\frac{3}{2}} - 2.\frac{2}{3}(y+(x+1))^{\frac{3}{2}}\Big|_0^1 =$$

$$= \frac{4}{3}\left[(x+3)^{\frac{3}{2}} - (x+2)^{\frac{3}{2}} - (x+2)^{\frac{3}{2}} + (x+1)^{\frac{3}{2}}\right] = \frac{4}{3}\left[(x+3)^{\frac{3}{2}} - 2(x+2)^{\frac{3}{2}} + (x+1)^{\frac{3}{2}}\right]$$

$$\int_0^1 \frac{4}{3}\left[(x+3)^{\frac{3}{2}} - 2(x+2)^{\frac{3}{2}} + (x+1)^{\frac{3}{2}}\right]dx = \frac{8}{15}\left[(x+3)^{\frac{5}{2}} - 2(x+2)^{\frac{5}{2}} + (x+1)^{\frac{5}{2}}\right]_0^1 =$$

$$= \frac{8}{15}\left[(4^{\frac{5}{2}} - 2.3^{\frac{5}{2}} + 2^{\frac{5}{2}}) - (3^{\frac{5}{2}} - 2.2^{\frac{5}{2}} + 1)\right] = \frac{8}{15}\left[2^5 - 3^3.3^{\frac{1}{2}} + 3.2^2.2^{\frac{1}{2}} - 1\right] =$$

$$= \frac{8}{15}\left[31 - 27.\sqrt{3} + 12\sqrt{2}\right]$$