ROMANIAN MATHEMATICAL MAGAZINE

Find:

$$\Omega=\int_0^1 \frac{1}{1+\sqrt{2x+1}}dx$$

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Solution by Daniel Sitaru-Romania

$$\Omega=\int_0^1 \frac{1}{1+\sqrt{2x+1}}dx \overset{y^2=2x+1}{=} \int_1^{\sqrt{3}} \frac{y}{1+y}dy=\int_1^{\sqrt{3}} \frac{1+y-1}{1+y}dy=$$

$$=\int_1^{\sqrt{3}} dy-\int_1^{\sqrt{3}} \frac{1}{1+y}dy=\sqrt{3}-1-ln\left(1+\sqrt{3}\right)+ln2=$$

$$=\sqrt{3}-1+ln\left(\frac{2}{1+\sqrt{3}}\right)$$