$$\int \operatorname{arctg}\sqrt{x}\,dx =$$

INT-S1-023

PER PARTI

$$= \int 1 \cdot \operatorname{arctg}\sqrt{x}\,dx =$$

$$= [S1] \cdot \operatorname{arctg}\sqrt{x} - \int [S1][D \operatorname{arctg}\sqrt{x}]\,dx$$

$$= x \operatorname{arctg}\sqrt{x} - \int x \frac{1}{1+x} \cdot \frac{1}{2\sqrt{x}}\,dx =$$

$$= x \operatorname{arctg}\sqrt{x} - \frac{1}{2}\int \frac{x}{(1+x)\sqrt{x}}\,dx =$$

$$= x \operatorname{arctg}\sqrt{x} - \frac{1}{2}\int \frac{\sqrt{x}\cdot\cancel{\sqrt{x}}}{(1+x)\cancel{\sqrt{x}}}\,dx =$$

$$= x \operatorname{arctg}\sqrt{x} - \frac{1}{2}\int \frac{\sqrt{x}}{1+x}\,dx =$$

SOSTITUZIONE $\sqrt{x} = z$

$$z' = \frac{dz}{dx} = \frac{1}{2\sqrt{x}}$$

$$dx = 2\sqrt{x}\,dz$$

$$= x \operatorname{arctg}\sqrt{x} - \frac{1}{2}\int \frac{z}{1+z^2}\,2 \cdot z\,dz =$$

$$= x \operatorname{arctg}\sqrt{x} - \frac{1}{\cancel{2}}\int \frac{\cancel{2} z^2}{1+z^2}\,dz =$$

$$= x \operatorname{arctg}\sqrt{x} - \int \frac{z^2+1-1}{1+z^2}\,dz =$$

$$= x \operatorname{arctg}\sqrt{x} - \int \frac{1+z^2}{1+z^2} - \frac{1}{1+z^2}\,dz =$$

$$= x \operatorname{arctg}\sqrt{x} - \int 1\,dz + \int \frac{1}{1+z^2}\,dz =$$

$$= x \operatorname{arctg}\sqrt{x} - z + \operatorname{arctg} z + K =$$

$$= \boxed{x \operatorname{arctg}\sqrt{x} - \sqrt{x} + \operatorname{arctg}\sqrt{x} + k}$$