23. $y = \cos x + \sin(2x) \qquad 0 \le x \le \frac{\pi}{2}$

$$\text{AREA} = \int_0^{\frac{\pi}{2}} (\cos x + \sin 2x)\, dx$$

$$= \int_0^{\frac{\pi}{2}} \cos x\, dx + \int_0^{\frac{\pi}{2}} \sin 2x\, dx$$

$u = 2x \quad du = 2\, dx$

$$= [\sin x]_0^{\frac{\pi}{2}} + \frac{1}{2} \int_0^{\frac{\pi}{2}} 2 \sin 2x\, dx$$

$$= \sin\frac{\pi}{2} - \sin 0 + \frac{1}{2} \int_{x=0}^{x=\frac{\pi}{2}} \sin u\, du$$

$$= 1 - 0 + \frac{1}{2} [-\cos u]_{x=0}^{x=\frac{\pi}{2}}$$

$$= 1 - \frac{1}{2} [\cos 2x]_0^{\frac{\pi}{2}}$$

$$= 1 - \frac{1}{2} \left[\cos 2 \cdot \frac{\pi}{2} - \cos 2 \cdot 0\right]$$

$$= 1 - \frac{1}{2} [-1 - 1]$$

$$= 1 - \frac{1}{2} (-2)$$

$$= 1 + 1$$

$$= \boxed{2}$$