NEW FORMULA 3.853.1

The original formula is

$$\int_0^\infty \frac{\sin(ax^2)}{\beta^2+x^2}\,dx = \frac{\pi}{2\beta}\left[\sqrt{2}\sin\left(a\beta^2+\frac{\pi}{4}\right)C(\sqrt{a}\beta) - \sqrt{2}\cos\left(a\beta^2+\frac{\pi}{4}\right)S(\sqrt{a}\beta) - \sin(a\beta^2)\right]$$

The change of variables $x = t/\sqrt{a}$ and writing $b = \sqrt{a}\beta$ gives the new formula (going back to x as the integration variable)

$$\int_0^\infty \frac{\sin(x^2)}{b^2+x^2}\,dx = \frac{\pi}{2b}\left[\sqrt{2}\sin\left(b^2+\pi/4\right)C(b) - \sqrt{2}\cos\left(b^2+\pi/4\right)S(b) - \sin(b^2)\right]$$