NEW FORMULA 3.856.5

The original formula is

$$\int_0^\infty \frac{\cos(a^2x^2)\,dx}{\sqrt{\beta^4+x^4}\sqrt{(x^2+\sqrt{\beta^4+x^4})^3}} = \frac{\sinh\frac{a^2\beta^2}{2}}{2\sqrt{2}\beta^4} K_1\left(\frac{a^2\beta^2}{2}\right)$$

The change of variables $x = \beta t$ and replacing $a^2\beta^2$ by $2a$ gives the new formula (going back to x as the integration variable)

$$\int_0^\infty \frac{\cos(2ax^2)\,dx}{\sqrt{1+x^4}\sqrt{(x^2+\sqrt{1+x^4})^3}} = \frac{\sinh a\,K_1(a)}{2\sqrt{2}}$$