$$a{:}b \curvearrowright \underset{2}{\overbrace{a+b}} \,|\, \overbrace{ab}^{1/2}$$

$$\int\limits_{-\pi/2}^{\pi/2} \frac{dt}{\sqrt{{}^t\mathfrak{c}^2 a^2 + {}^t\mathfrak{s}^2 b^2}} = \int\limits_{-\infty}^{\infty} \frac{du}{\sqrt{\underbrace{u^2+a^2}\underbrace{u^2+b^2}}} = 2\int\limits_{0}^{\infty} \frac{du}{\sqrt{\underbrace{u^2+a^2}\underbrace{u^2+b^2}}}$$

$$t \in -\frac{\pi}{2}\Big|\frac{\pi}{2} \xrightarrow{\mathcal{V}} \mathbb{R} \ni u = {}^t\mathcal{V} = {}^t\mathfrak{t}\, b = \frac{{}^t\mathfrak{s}}{{}^t\mathfrak{c}} b$$

$$\frac{du}{dt} = {}^t\underline{\mathcal{V}} = b/{}^t\mathfrak{c}^2 \Longrightarrow {}^t\mathfrak{c}^2\, du = b\, dt$$

$${}^t\mathfrak{c}^4 \underbrace{u^2+a^2}\underbrace{u^2+b^2} = \underbrace{{}^t\mathfrak{c}^2 a^2 + {}^t\mathfrak{s}^2 b^2}\, b^2$$

$$\text{LHS} = {}^t\mathfrak{c}^2 \underbrace{b^2 \frac{{}^t\mathfrak{s}^2}{{}^t\mathfrak{c}^2} + a^2}\; {}^t\mathfrak{c}^2 \underbrace{b^2 \frac{{}^t\mathfrak{s}^2}{{}^t\mathfrak{c}^2} + b^2} = \underbrace{{}^t\mathfrak{c}^2 a^2 + {}^t\mathfrak{s}^2 b^2}\, b^2 \underbrace{{}^t\mathfrak{c}^2 + {}^t\mathfrak{s}^2}_{=1} = \text{RHS}$$

$$\frac{dt}{\sqrt{{}^t\mathfrak{c}^2 a^2 + {}^t\mathfrak{s}^2 b^2}} = \frac{du}{\sqrt{\underbrace{u^2+a^2}\underbrace{u^2+b^2}}}$$

$$\int_{-\infty}^{\infty} \frac{dv}{\sqrt{\underbrace{v^2+a^2}\,\underbrace{v^2+b}^{2}}} = \int_{-\infty}^{\infty} \frac{du}{\sqrt{\underbrace{u^2+ab}\,\underbrace{u^2+\overbrace{a+b}^{2}_{2}}}}$$

$$u \in -\infty|\infty \xrightarrow{\lrcorner} 0|\infty \ni v = {}^{u}\lrcorner = u+\sqrt{u^2+ab} = \frac{ab}{-u+\sqrt{u^2+ab}}$$

$$v^2 = 2uv + ab$$

$$\overbrace{u+\sqrt{u^2+ab}}^{2} = u^2 + 2u\sqrt{u^2+ab} + u^2 + ab = 2u\underbrace{u+\sqrt{u^2+ab}} + ab$$

$$\frac{dv}{v} = \frac{du}{\sqrt{u^2+ab}}$$

$$2v\,{}^{u}\underline{\lrcorner} = 2v + 2u\,{}^{u}\underline{\lrcorner} \Longrightarrow \underbrace{v-u}\,{}^{u}\underline{\lrcorner} = v \Longrightarrow \frac{dv}{du} = {}^{u}\underline{\lrcorner} = \frac{v}{v-u}$$

$$\frac{v^2+a^2}{2}\frac{v^2+b^2}{2} = v^2\,\underbrace{u^2+\overbrace{a+b}^{2}_{2}}$$

$$\text{LHS} = \frac{2uv+ab+a^2}{2}\frac{2uv+ab+b^2}{2} = \underbrace{uv+a\overbrace{a+b}_{2}}\,\underbrace{uv+b\overbrace{a+b}_{2}} = u^2\,v^2 + uv\overbrace{a+b}\,\overbrace{a+b}_{2} + ab\,\overbrace{a+b}^{2}_{2}$$

$$= u^2\,v^2 + \underbrace{2uv+ab}\,\overbrace{a+b}^{2}_{2} = u^2\,v^2 + v^2\,\overbrace{a+b}^{2}_{2} = \text{RHS}$$

$$\frac{2dv}{\sqrt{\underbrace{v^2+a^2}\,\underbrace{v^2+b}^{2}}} = \frac{du}{\sqrt{\underbrace{u^2+ab}\,\underbrace{u^2+\overbrace{a+b}^{2}_{2}}}}$$

$$\text{RHS} = \frac{dv}{v\sqrt{u^2+\overbrace{a+b}^{2}_{2}}} = \frac{dv}{\sqrt{v^2\,\underbrace{u^2+\overbrace{a+b}^{2}_{2}}}} = \frac{dv}{\sqrt{\frac{v^2+a^2}{2}\frac{v^2+b^2}{2}}} = \frac{dv}{\frac{1}{2}\sqrt{\underbrace{v^2+a^2}\,\underbrace{v^2+b}^{2}}} = \text{LHS}$$