1b) QUEREMOS:

$$\int x^{\alpha} \sqrt{x^2 - b^2} \, ^{\beta} dx$$

$$= W \int U^{\alpha} \sqrt{U^2 - 1} \, ^{\beta} du$$

$$Temos:$$

$$\int x^{\alpha} \sqrt{x^2 - b^2} \, ^{\beta} dx$$

$$= \int x^{\alpha} \sqrt{b^2 \left(\left(\frac{x}{b} \right)^2 - 1 \right)} \, ^{\beta} dx$$

 $= \int x^{\alpha} \sqrt{b^{2} \left(\left(\frac{x}{b} \right)^{2} - 1 \right)}^{\beta} dx$ $= \int x^{\alpha} \left(b \sqrt{\left(\frac{x}{b} \right)^{2} - 1} \right)^{\beta} dx$ $= b^{\beta} \int x^{\alpha} \sqrt{\left(\frac{x}{b} \right)^{2} - 1}^{\beta} dx \qquad \begin{bmatrix} u = \frac{x}{b} \\ bu = x \\ bdu = dx \end{bmatrix}$ $= b^{\beta} \int (bu)^{\alpha} \sqrt{u^{2} - 1}^{\beta} dy dy \qquad \begin{bmatrix} b du = dx \\ bdu = dx \end{bmatrix}$

$$= b^{\beta} \int x^{\alpha} \sqrt{\left(\frac{x}{b}\right)^{2} - 1} \, ^{\beta} dx$$

$$= b^{\beta} \int (bu)^{\alpha} \sqrt{U^{2} - 1} \, ^{\beta} b du \quad \begin{bmatrix} bdu = dx \end{bmatrix}$$

$$= b^{\beta} \cdot b^{\alpha} \cdot b \int u^{\alpha} \sqrt{u^{2} - 1} \, ^{\beta} du$$

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$$= b^{\beta} \cdot b^{\alpha} \cdot b \int u^{\alpha} \sqrt{u^{2} - 1} \, ^{\beta} du$$

$$= b^{\beta} \int x^{\alpha} \sqrt{x^{2} - b^{2}} \, ^{\beta} dx \quad \begin{bmatrix} u = \frac{x}{b} \end{bmatrix}$$

$$= b^{\beta} \int (bu)^{\alpha} \sqrt{u^{2} - 1} \, ^{\beta} du$$

$$= b^{\beta} \int (bu)^{\alpha} \sqrt{u^{2} - 1} \, ^{\beta} du \quad \begin{bmatrix} u = \frac{x}{b} \end{bmatrix}$$