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$$\begin{cases} \log_x(xy) = \log_y(x^2) \\ y^{2\log_y x} = 4y+3 \end{cases}$$

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$$x, y > 0$$

$$\begin{cases} \log_x x + \log_x y = 2\log_y x \\ y \log_y x^2 = 4y+3 \end{cases} \begin{cases} 1+A = \frac{2}{A} \\ A = \log_x y \end{cases} \rightarrow \begin{cases} A^2 + A - 2 = 0 \\ A = -2 \Rightarrow \log_x y \Rightarrow \frac{1}{x^2} = y \\ A = 1 = \log_x y \Rightarrow x = y \end{cases}$$

$$x^2 = t \quad x^2 = \frac{4}{x^2} + 3 \quad \sqrt{\text{ap}} \uparrow \Rightarrow \frac{1}{x^2} = y \quad \sqrt{\text{ap}} \downarrow$$

$$t^2 - 3t - 4 = 0$$

$$t = 4 = x^2 \rightarrow x = 2, x = -2 \rightarrow y = \frac{1}{4} \quad (2, \frac{1}{4})$$

$$t = -1 \rightarrow \emptyset$$

$$\sqrt{\text{ap}} \quad x = y \quad \sqrt{\text{ap}} \downarrow$$

$$y^2 = 4y+3$$

$$y^2 - 4y - 3 = 0$$

$$y = \frac{4 \pm \sqrt{28}}{2} = 2 \pm \sqrt{7}$$

$$(2+\sqrt{7}, 2+\sqrt{7}) \quad \sqrt{\text{ap}} \downarrow \quad (0, 1, 3) \quad 2-\sqrt{7} \quad \sqrt{\text{ap}} \downarrow$$