Index issues

underground mathematics

Problem

$\sqrt{x}$ or $x^{\frac{1}{2}}$? Whichever we prefer, we need to be comfortable working with indices and roots in either form.

Below is a series of equations, for which you should think about the following questions.

✱

For what values of x and y do these statements make sense?

What are the possible values for the expressions?

(1) $(xy)^{\frac{1}{2}} = x^{\frac{1}{2}}y^{\frac{1}{2}}$

(2) $(xy)^{\frac{5}{3}} = x^{\frac{5}{3}}y^{\frac{5}{3}}$

(3) $(xy)^{\frac{2}{3}} = x^{\frac{2}{3}}y^{\frac{2}{3}}$

(4) $(xy)^{-\frac{1}{2}} = x^{-\frac{1}{2}}y^{-\frac{1}{2}}$

(5) $(xy)^{\frac{1}{2}} = x^{\frac{1}{3}}y^{\frac{2}{3}}$

(6) $(xy)^{-2} = x^2y^2$

(7) $\left(\frac{x}{y}\right)^{-\frac{1}{3}} = x^{-\frac{1}{3}}y^{\frac{1}{3}}$

(8) $\left(\frac{x}{y} - \frac{1}{y}\right)^{\frac{1}{2}} = y^{-\frac{1}{2}}(x-1)^{\frac{1}{2}}$