Example

$$\frac{3}{5} \div \frac{2}{7} \Rightarrow \frac{3}{5} \times \frac{7}{2} = \frac{21}{10}$$

So why does

$$\frac{a}{b} \div \frac{c}{d} \Rightarrow \frac{a}{b} \times \frac{d}{c}$$

A Very Informal Proof

Note:

$u \div v \Leftrightarrow \frac{u}{v}$

Therefore

$$\frac{a}{b} \div \frac{c}{d} \Rightarrow \frac{\frac{a}{b}}{\frac{c}{d}}$$

And to simplify a complex fraction, we multiply both the numerator and denominator by the reciprocal of the denominator.

$$\frac{\frac{a}{b}}{\frac{c}{d}} \times \frac{\frac{d}{c}}{\frac{d}{c}} \Rightarrow \frac{\frac{a}{b} \times \frac{d}{c}}{\frac{c}{d} \times \frac{d}{c}} \Rightarrow \frac{\frac{a}{b} x \frac{d}{c}}{1} \Rightarrow \frac{a}{b} \times \frac{d}{c}$$

Therefore

$$\frac{a}{b} \div \frac{c}{d} \Rightarrow \frac{a}{b} \times \frac{d}{c}$$