

ICTS-RRI MATHS CIRCLE
August 22, 2026

Return to the world of prime worlds from our earlier session. Pick an odd prime number p , and work in the world with p colours.

Take each colour, multiply it by itself. You will find that only some colors turn up as an answer. Call these the *square colours*.

Work this out for a few small primes. How many square colours are there, compared to the total?

Now take two odd primes, p and q . Ask: is p a square in the q -coloured world? Is q a square in the p -coloured world?

Try a few pairs. Sometimes the two questions have the same answer. Sometimes they don't.

Try this in particular with “*twin primes*”: pairs like $(3, 5)$, $(5, 7)$, $(11, 13)$, $(17, 19)$ that differ by 2. Do the two answers ever disagree, for a twin prime pair?

Now try it with some pairs that are not twins.

When the two answers disagree, what is special about the pair (p, q) ?

Now return to the question:

Might knots, primes, and electromagnetism all be shadows of the same thing?

Stay with it.