

Math 101 Homework

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Complete the following problems. Fully justify each response.

1. Suppose a, b, c, d are integers such that

- a and b share no factors.
- c and d share no factors.
- $a^2d^2 + b^2c^2 = b^2d^2$

Prove that b and d must both be odd.

2. In class we showed that \mathbb{Q} is countable. Prove that this implies \mathbb{Q}^2 is also countable.
3. Let X be a set, and $S \subset X$. Explain (in your own words) what it means for S to be dense in X .