My Homework

My Name

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Question 1.2.3.4.5.6.7

Your text goes here. Here's an example displayed equation:

$$\mathcal{S} = \left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} : a, b, c, d \in \mathbb{Z} \right\}$$

and here's another:

$$3 \equiv 7 \pmod{4}.$$

Displayed equations display nicely centered on their own lines. Look up symbols you don't know at `detexify.kirelabs.org`.

You can also write inline equation like this: $a = bc$. They fit right into the text. I can make fractions like $\frac{1}{3}$ and I can say something is an integer like this: $z \in \mathbb{Z}$.

Here's an example theorem.

Theorem 1. *There are infinitely many primes.*

Proof. The number 2 is certainly prime (it is divisible only by 1 and itself), so there is at least one prime.

Suppose, for a contradiction, that there are only finitely many, say n of them, and list them as follows:

$$p_1, \ldots, p_n.$$

Then consider the integer

$$N = p_1 p_2 \cdots p_n + 1.$$

N has a remainder of 1 when divided by any of the p_i. Therefore it is not divisible by any of the p_i. But it is certainly greater than 1 and hence divisible by some prime, which must not be in our finite list. By this contradiction, the theorem is proved. □

Remark: This proof depends on the fact that every number is divisible by some prime. We haven't proven that yet.

Some stuff

Definition 1. *Let $a, b \in \mathbb{Z}$. We say that a* is divisible by *b (and write $b \mid a$), if there exists an integer c such that $bc = a$.*

Do the following exercise:

Exercise 1. *Do 10 jumping jacks!*