Math 135, First LaTeX assignment

LaTeX is a typesetting system that is used for producing high-quality documents. It is particularly good for math, and it is used by most mathematicians and many scientists. It has become traditional in Math 135 to introduce students to LaTeX.

You should begin by signing up for a free account on overleaf.com, a web site where you can create documents using LaTeX. (You will have no need for a paid account, which is mainly for people who collaborate on documents in groups of three or more people.) I will ask you to "share" your first LaTeX project with me so that I can check that you have done this, and possibly comment on your work.

You should read the handout on LaTeX, which was written by Professor Alden Gassert. We will also discuss LaTeX in class from time to time.

The link https://www.overleaf.com/read/hdntpsqyczwh, which you can find on the course web page, will allow you to read and copy the source code for this document (but not edit it). You should begin this assignment by creating a new project in Overleaf. If you want, you can delete everything but the theorems. You should copy the source code for this document into your own document, replacing the default text that was added there by Overleaf. You should then write proofs for the following theorems.

Once you have written the proofs, you should share your project with me. I will get an email saying that you have done so. Sharing your project will turn in your homework. I will print out a copy of your work for grading. You should do this by next Monday, October 7. There will probably be some additional homework to be turned in next Wednesday, October 9.

Theorem 1. Let a, b, and c be integers, where a and b are not both zero, and c is not zero. Then $\gcd(ca, cb) = c \cdot \gcd(a, b)$.

Proof. Type your proof here! $\square$

Theorem 2 (Use contrapositive proof)**.** Let $a, b, c \in \mathbb{N}$. If a does not divide bc, then a does not divide b.

Proof. Type your proof here! $\square$

Theorem 3. If $a \equiv b \pmod{n}$ and $c \equiv d \pmod{n}$, then $ac \equiv bd \pmod{n}$.

Proof. Type your proof here! Hint: $ab - bd = ab - ad + ad - bd$. $\square$

Theorem 4. Let r and s be rational numbers. Then $r + s$ is rational.

Proof. Type your proof here! $\square$

Theorem 5 (Use proof by contradiction)**.** For any real number x, one of the numbers x and $x - \pi$ is irrational.

Proof. Type your proof here! $\square$