MATH 316: ASSIGNMENT 1

YOUR NAME

Exercise 1. Let a and b be two real numbers. Prove $a \leq b$ if and only if, for any $\varepsilon > 0$, $a < b + \varepsilon$.

Solution. One direction is simple: if $a \leq b$, then $a \leq b < b + \varepsilon$ for any $\varepsilon > 0$.

On the other direction, assume $a < b + \varepsilon$ for any $\varepsilon > 0$ but $a > b$. Then $\varepsilon_0 = a - b > 0$ and $a = a - b + b = b + \varepsilon_0$, which contradicts to $a < b + \varepsilon$ fails for all $\varepsilon > 0$. □

Exercise 1.2.5. Using the triangle inequality to establish the inequalities

(a) $|a - b| \leq |a| + |b|$
(b) $||a| - |b|| \leq |a - b|$.

Solution. This gives an example on how to type a list. □

Example. Here are example of displayed formulas:

$$f(x) = 1 + x^2 \sin x + \sqrt{x}$$

and (this one has the equation number)

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n, \qquad -1 < x < 1. \tag{1}$$

Here is an example of multi-lined equations:

$$\begin{aligned} f(x) &= \frac{1}{1-x} \\ &= \sum_{n=0}^{\infty} x^n, \qquad -1 < x < 1. \end{aligned}$$