Today Ruler Placement

Section 3.10 Ruler Placement in High School Geometry Books

Theorem 10(4) Ruler Siding

Suppose \( f : L \rightarrow \mathbb{R} \) is a coordinate function for some line \( L \).

Suppose \( c \) is a real number constant.

Suppose \( g : L \rightarrow \mathbb{R} \) is a new function defined by \( g(P) = f(P) + c \).

Claim: The new function \( g \) is also qualified to be called a coordinate function for line \( L \).
Consider the proof structure necessary to prove this.

**Proof**

Suppose blah blah blah

all of the given stuff goes here

we need to fill in these steps.

Conclude that $g$ is qualified to be called a coordinate function for line $L$.

End of proof.
But "coordinate function" is a defined term.

So to end by saying that $g$ is a coordinate function, we will have to have proven that $g$ meets all the requirements in the definition of coordinate function.

Proof structure now looks like this:

**Proof**

1. Suppose that (Given stuff)
2. Narrow down.
3. Show that $g$ satisfies all the requirements listed in the definition of a coordinate function.
4. Conclude that $g$ is a coordinate function.

End of Proof.
And to say that \( f \) is a coordinate function means that \( f \) satisfies all the requirements. That stuff must be written after \( f \) is introduced.

Proof structure now looks like this:

**Proof**

**Given**

- Line \( L \)
- Coordinate function \( f \) for line \( L \)
- Real number \( c \)
- Function \( g \) defined by \( g(P) = f(P) + c \)

**f** has certain properties

- \( f: L \rightarrow \mathbb{R} \)
- \( f \) is one-to-one and onto
- \( f \) satisfies equation \( d(P, Q) = |f(P) - f(Q)| \)

**We must show that** \( g: L \rightarrow \mathbb{R} \)

- \( g \) is one-to-one and onto
- \( g \) satisfies equation \( d(P, Q) = |g(P) - g(Q)| \)

**End of proof.**

We can conclude that \( g \) is a coordinate function (by definition of coordinate function).