9/1/21

History of Math

PreQ

(1.) My career goals are to work for the US Government using math and political science.

(2.) My hobbies include, playing sports, reading, and learning new things.

(3.) A rational number is a number that can be expressed as a quotient of two coprime integers.

(4.) Let x, y be two rational numbers. Thus, $x = \frac{a}{b}$ and $y = \frac{c}{d}$ where a, b, c, d are integers. $x + y = \frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$. Since a, b, c, d are integers, their products and sums are also integers. Therefore $x + y$ is rational.

(5.) $(3 + \sqrt{3}) - (1 + \sqrt{3}) = 2 \in \mathbb{Q}$ so we have disproven the claim.

(6.)

(7.) Let's assume for sake of contradiction that $\sqrt{5}$ is rational. That means we can express $\sqrt{5}$ as $\frac{m}{n}$ where m, n are some coprime integers.

So, $\sqrt{5} = \frac{m}{n} \rightarrow 5 = \frac{m^2}{n^2} \rightarrow 5n^2 = m^2$. We can say that 5 divides m^2, and m is a multiple of 5. Thus, $m = 5p$ for some $p \in \mathbb{Z}$. So, $m = 5p \rightarrow m^2 = 25p^2$. We know that $m^2 = 5n^2$, so $5n^2 = 25p^2 \rightarrow n^2 = 5p^2$.

So both m, n have a common factor of 5. Thus, they cannot be coprime, so $\sqrt{5}$ is not rational