Supplementary Exercises for Section 11.2

1. If A, B, and C are the vertices of a triangle. Find $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CA}$.

2. Consider the 12 vectors that have their tail at the center of a clock and their respective heads at each of the 12 digits. What is the sum of these vectors. What if we remove the vector corresponding to 4 o'clock is deleted? What if, instead, all vectors have their tail at 12 o'clock, and their heads on the remaining digits?

3. Let $\mathbf{x}$ and $\mathbf{y}$ be nonzero vectors in $\mathbb{R}^2$ that are not parallel. Show, algebraically, that if $\mathbf{z}$ is any vector in $\mathbb{R}^2$, that there are scalars s and t such that $\mathbf{z} = s\mathbf{x} + t\mathbf{y}$.

4. Does the statement for exercise 3 hold if the vectors $\mathbf{x}$ and $\mathbf{y}$ are taken to be in $\mathbb{R}^3$? Why or why not?