Quiz 1 (Sections 1.1, 1.2)

You will have 30 minutes to complete the quiz.

Name:
Student Number:

Q1 For the following, find all scalars $c \in \mathbb{R}$, if any exists, such that the statement is true.

     a. The vectors $\begin{bmatrix} -3 \\ c \end{bmatrix}$ and $\begin{bmatrix} 5 \\ 2 \end{bmatrix}$ are parallel. (1 point)

     b. The vectors $\begin{bmatrix} 2 \\ c \end{bmatrix}$ and $\begin{bmatrix} -2 \\ c \end{bmatrix}$ are perpendicular. (1 point)

     c. The norm of the vector $\begin{bmatrix} 3 \\ c \end{bmatrix}$ is zero. (1 point)

Q2 Here, we will show that for any vector $\vec{v} \in \mathbb{R}^n, \|v\|^2 = v \cdot v$.

     a. Write the equation for the norm of a vector in $\mathbb{R}^n$. (1 point)

     b. Write the equation for the dot product of a vector in $\mathbb{R}^n$ with itself. (1 point)

     c. Prove that for any vector $\vec{v} \in \mathbb{R}^n, \|\vec{v}\|^2 = \vec{v} \cdot \vec{v}$. (1 point)

Q3 Using vectors, show that the midpoints of the four sides of a quadrilateral are the vertices of a parallelogram. **Hint.** It may be useful to make a sketch and label vertices/intersections. (2 points)

Q1

Q2

Q3