MTH 411, Fall 2018, Quiz 4 (Tuesday Short Quiz/6 pts)

1. **(2 points)** Define $\mathrm{GL}(n, \mathbb{R})$, the **general linear group of degree** n.

   - **Solution.** Let $\mathrm{M}(n, \mathbb{R})$ denote the set of all $n \times n$ matrices with entries in $\mathbb{R}$. Then

     $$\mathrm{GL}(n, \mathbb{R}) := \{A \in \mathrm{M}(n, \mathbb{R}) \mid A \text{ is invertible } \}$$

     is a group under the operation of matrix multiplication.

2. **(2 points)** Given a binary algebraic structure $\langle U, \star \rangle$, what does it mean for $e \in U$ to be a **right identity element**?

   - **Solution.** $e \in U$ to be a right identity element if for every $x \in U$, we have that

     $$x \star e = x.$$

3. **(2 points)** Define V, the **Klein** 4**-group**.

   - **Solution.** The **Klein** 4**-group**, V, is defined as follows:

     $$V := \{e, a, b, c\}$$

     and its group table[1] is given below:

	e	a	b	c
e	e	a	b	c
a	a	e	c	b
b	b	c	e	a
c	c	b	a	e

[1] Visit `https://tex.stackexchange.com/questions/131771/creating-multiplication-table-of-symmetric-group-s-3` for code to create this table.