

Practice Exam 1

**1.** Let  $f : \mathbb{Z} \times \mathbb{Z} \rightarrow \mathbb{Z} \times \mathbb{Z}$  defined by  $f(m, n) = (5m + 4n, 4m + 3n)$ . Is  $f$  a function? Is it one-to-one? Is it onto?

1. Written Solution

2. Video Solution

**2.** Prove that matrix multiplication is a noncommutative operation on the set of all  $2 \times 2$  matrices with real entries.

1. Written Solution

2. Video Solution

**3.** Let  $F$  be the set of all mappings from  $\mathbb{R} \rightarrow \mathbb{R}$ . Define  $+$  on  $F$  as, for all  $f, g \in F$ ,  $(f + g)(x) = f(x) + g(x)$ . Show that, with this operation,  $F$  is a group.

1. Written Solution

2. Video Solution

**4.** Let  $F$  be the set of all mappings from  $\mathbb{R} \rightarrow \mathbb{R}$ . Show that  $f$  is not a group with respect to composition of functions.

1. Written Solution

2. Video Solution