Work on these with your partner(s) at the board

1. Define the relation S on $\mathbb{R}$ by $x \; S \; y$ iff $x - y$ is an integer.
   (a) List three pairs of real numbers that are in S and three pairs that are not
   (b) Prove that S is an equivalence relation
   (c) Describe the distinct equivalence classes of S

2. Let $A = \mathbb{Z} \times (\mathbb{Z} - \{0\})$
   Define a relation R on A by $(a, b) \; R \; (c, d)$ iff $ad = bc$
   (a) Show that $(6, 4) \; R \; (9, 6)$
   (b) Give three additional pairs from A that are related by R
   (c) Give three pairs from A that are *not* related by R
   (d) Prove that R is an equivalence relation
   (e) Describe all elements in the equivalence class of $(3, 2)$
   (f) Describe the distinct equivalence classes of R

based on Epp, Example 8.3.12