Exercise Batch 13
Taken from John B. Fraleigh,
*A First Course in Abstract Algebra, Fifth Edition*

From *Page 350 ff*: 1, 2 (this is not entirely easy!), 4, 5, 7-13, 15 (Likewise find a similarly defined matrix ring that is isomorphic with the ring of Gaussian integers), 19, 21, 22, 23, 27, 31, 32, 33, 35, 36, 37, 40 (have I assigned this problem before; check your earlier batches of homework).

From *Page 360 ff*: 3, 4, 5-9, 10, 11, 12, 14, 15, 20, 21, 24, 26, 27, 28.

Also:

1. In the ring $\mathbb{Z}[x]$, define the ideals $I_1 = (2), I_2 = (x), I_3 = (2, x)$. Prove that $I_1$ and $I_2$ are prime ideals and that $I_3$ is a maximal ideal. (Try to do this by setting up the appropriate homomorphisms.)