Math3230 Abstract Algebra Homework 6 Individual Notes

- Each student should submit their own notes of the following. (Either write these in your notebook, or use Overleaf)
- Note: *factor groups* are the same as *quotient groups*.

1 Fundamental homomorphism theorem (First Isomorphism Theorem)

Look up the following in Slides 4.3 and M. Macauley's video of Slides 4.3, or Theorem 11.10 of Judson: abstract.ups.edu/aata/section-group-isomorphism-theorems.html.

- Write down the statement of the Fundamental Homomorphism Theorem (First Isomorphism Theorem)
- Write the definition of the map i which is the bijective homomorphism in the proof.
- Prove that i is well-defined

2 Diamond Isomorphism Theorem (Second Isomorphism Theorem)

Look up the following in Slides 4.5, M. Macauley's video of Slides 4.5, and 11.12 of Judson: abstract.ups.edu/aata/s group-isomorphism-theorems.html.

- Write down the statement of the Diamond Isomorphism Theorem (Second Isomorphism Theorem).
- Draw the "diamond" picture.
- Write down the definition of the map ϕ which is the surjective homomorphism in the proof of the theorem.

3 The Third Isomorphism Theorem

Look up the following in Slides **4.5** and M. Macauley's video of Slides **4.5**, and proof of Theorem 11.3 and 11.4 of Judson: abstract.ups.edu/aata/section-group-isomorphism-theorems.html as resources.

- Write down the statement of the Third Isomorphism Theorem.
- Write down an explanation (to yourself) the picture given in the slides/video.
- Write down the definition of the map φ which is the surjective homomorphism in the proof of the theorem.