MAT347Y1 HW1 Marking Scheme

Friday, September 25

Note: The purpose of these marking schemes is to point out common errors or omissions, not to give a comprehensive description of every grading decision.

Total: 20 points.

1.1.20: 4 points.

- (2) Finite case: $x^n = 1$ implies $(x^{-1})^n = 1$ (note that this does NOT imply $|x^{-1}| = n$)

- (1) Finite case: $|x^{-1}| = |x|$

- (1) When x has infinite order

1.1.25: 3 points.

1.2.5: 5 points.

- (2) Case r^i $(1 \leq i < n)$

- (2) Case sr^i $(0 \leq i < n)$

- (1) Proof that $r^i \neq r^{-i}$ for $1 \leq i < n$ (this fact can't just be assumed! Note that in D_{12}, $r^3 = r^{-3}$).

1.2.10: 4 points.

- (3) A counting argument giving 24 symmetries

- (1) Proving why the 24 symmetries found above give a complete list. Note that if you allow reflections (i.e. if you followed the method used to find the size of D_{2n}), there are actually 48 symmetries! A "how many places can each vertex go" argument needs to explain how orientation allows us to reject certain arrangements (an argument based on "what rotations are possible" isn't as simple to describe but is less likely to run into an issue like this).

1.4.2: 4 points.

- (1) Correct list of elements

- (1) Identity is order 1

- (1) Three elements of order 2

- (1) Two elements of order 3