A2 marking scheme

All questions are marked out of 15, for a total of 60 marks.

1. Marked from 0–5, then weighted by 3:

0	incorrect conjecture, no proof given
1	incorrect conjecture, attempt at a proof
2	correct conjecture, no proof or only proof for the base case, or incorrect proof
3	correct conjecture, informal proof or a proof missing an import step, such as justifying $\|U_{n,k}\| = \|U_k\|\|U_{n-1-k}\|$.
4	correct conjecture, flawed proof
5	correct conjecture, correct proof

   Here were some common errors:

   C1: correct idea, but not a formal proof by induction.

   C2: took $n = 1$ as the base case, using $B(0) = 1$ without any comment.

   C3: for base case, you only need to consider $n = 0$, you don't need to consider $n = 1$, $n = 2$, ...

   C4: missed justification for $|U_{n,k}| = |U_k||U_{n-1-k}|$.

2. Here are common errors:

   C1: Informal use of induction (-1 mark).

   C2: Didn't use $F(k+1) + F(k+2) = F(k+3)$ (-1 mark).

3. (a) This sub-question was marked out of 8:

2	predicate correct defined, but no proof
4	predicate correct defined, but major errors in proof
6	only minor errors in proof, or small parts missing
8	correct

   (b) This sub-question was marked out of 7:

1	base case
2	induction step
3	existence part only
7	existence and uniqueness

4. (a)

   (b) Here is a common error:

   Missing extreme points: In the induction step you should treat $n = 0$ and $n = m + 1$ as special cases.