Example 2: Euler's totient theorem

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	3	2	2	6	6	16	16
Maximum possible achievement level	4	3	4	3	6	6	20	20

Student work (PDF)

Annotated student work (PDF)

Comments

Comments

Criterion A: Communication

A3—The work is concise, as it proves the conjecture in fewer than seven pages. It fulfills the aims, is well organized and complete. The exploration would benefit from more complete explanations (refer to page 7 annotation).

Criterion B: Mathematical presentation

B3—Condone use of "N" rather than "n" in the table on page 4. The class was familiar with the modular arithmetic, so definitions were not needed.

Criterion C: Personal engagement

C2—There was evidence of sufficient personal interest to award a level 2.

Criterion D: Reflection

D2—It links areas of maths. There is reflection on the elegance of the mathematics (page 7).

SL Criterion E: Use of mathematics

E6—It is highly unlikely that a mathematics SL student will produce work of this calibre, but it obviously achieves level 6.

HL Criterion E: Use of mathematics

E6—It is commensurate with the level of the course, precise and demonstrates thorough knowledge, insight, sophistication and the rigour expected for mathematics HL.

General comments

Background information from the teacher:

"The student is a further mathematician and as such has been taught the 'Discrete' and 'Sets, relations and groups' options. He is therefore familiar with the language of modular arithmetic and had encountered Fermat's little theorem in class. The proof of this theorem, although not required in the syllabus, was set as a homework. In his research of this, he also encountered Euler's totient theorem. He then asked to do a pure mathematics exploration. He absolutely did understand everything he wrote. If only all students were like him!"

The teacher's comment provides evidence that the student was personally engaged in the exploration and explains why some of the terms were not fully defined, as they were fully understood by the student and his class, which was his intended audience.

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