

Paper-based Test

UMIST

Interview with Colin Steele ■ Department of Mathematics

Abstract

All students are assessed using a paper-based written test on their first day in the department. The students are allowed to use any non-graphical calculator to help answer 48 questions of the type and standard that they should be familiar with from A-Level. The questions range across simple arithmetic and algebra through logs to differentiation and integration, finishing with some questions on vectors. Final solutions are filled in on an answer grid. The temporary streaming of the students is based on the results.

The Execution

This 80 minute invigilated test consists of 12 sections of four questions each. The test was conducted across five rooms simultaneously on the students' first day in the department. A calculator of a specific type was provided for the students, as was a formula sheet. Answers only were hand marked by the administrator, with a turn around of five days. Test results allowed temporary streaming for the first five weeks of term.

The Results

The test does not count towards the students' final assessment, but does have consequences. For the first five weeks the students are split into two groups; those who performed satisfactorily are provided with enrichment material, the rest do a basic maths revision course. On top of this revision students are encouraged to tackle areas that are indicated to be a problem by the diagnostic test (see [1]).

Following the 5-week revision period a second test is taken to assess progress. For this test a more sophisticated marking scheme will be used. About 30% of students are from overseas and these certainly appear to be better prepared for starting a degree in mathematics.

The Barriers

Clearly the staff time involved is high and the turn-around time causes a delay in feedback. Some students feel unhappy with a test on the first day.

The Enablers

The streaming helps address identified areas of common problems. For the revision course students are taught in small groups, which discourages anonymous absenteeism. Further an attendance record is kept and this can impact on their final course mark.

Reference

- [1] *Student Support Based on the Three Stream System at UMIST*, Maths Support for Students, LTSN Maths Team Project, 2003.

How Can Other Academics Reproduce This?

Resources and funding are required to allow the temporary splitting of the year cohort. This requires goodwill of colleagues and curriculum adjustment to compensate for the time the cohort is split.

Quality Assurance

The questions are based on A-Level standard questions. This means performance on the test should really reflect the student's level of competence.

Other Recommendations

The introduction of a new scheme that follows up and addresses lack of knowledge in students by using time at the start of the course should be monitored to verify its impact over the longer term on measures such as student drop out rate.

Section A

A1. Simplify $(a + 3b) + (b - 2c) - (a - b - c)$

A2. Solve the equation $5x + 11 = 36$

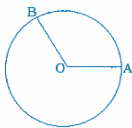
A3. Solve the simultaneous equations

$$\begin{aligned} 3x - y &= -6 \\ 4x + 2y &= 2 \end{aligned}$$

A4. Make x the subject of the formula $y = \frac{7}{x+2} - 1$

Section B

B5. Convert $\pi/5$ radians into degrees



B6. In the circle above, if angle AOB is 2 radians and the length of OA is 3 units, what is the area of the minor sector AOB.

B7. If $\sin \theta = \frac{1}{2}$ and $\frac{5\pi}{2} < \theta < 4\pi$, what is the value of θ ?

B8. Simplify $\sin\left(\frac{3\pi}{2} + \theta\right)$

Example of diagnostic test