Principal Assessor Report 2006

Assessment Panel:	**Mathematics and Statistics**

Qualification area

Subject(s) and Level(s) Included in this report	**Mathematics Higher**

Comments on candidate performance

General comments

Overall candidates scored well in this examination with about half of the candidates scoring between 50% and 75%.
Work was presented in a neat and orderly fashion and candidates appeared to have benefited from the realigned difficulty gradient.
Some candidates still fold the page in half and work in both columns. This is to be avoided, as is also the use of coloured pens and highlighters.

Areas in which candidates performed well

In Paper 1: straight line (1/1), circle (1/2), composition of functions (1/3) and stationary point requirements (1/5) continue to be done well. Improvements were noted in area under the curve (1/6) and there were good responses to the question (1/9) combining vectors and polynomials.

In Paper 2: there were good responses to the parabola question (2/2), related graphs (2/7) and the use of the chain rule (2/9). There was a noted improvement in the requirements for a proof at the beginning of 2/12.

Areas which candidates found demanding

In 1/3 failure to simplify the expressions from (a) led to some awkward algebra and failure to interpret the expression $16x^2 - 9$ was fairly common.
In 1/4 about half the candidates did not know the required condition and the arithmetic in (b) left a lot to be desired.
In 1/5 it was not uncommon to see $10(2x - 1)^4 = 0$ expanded (wrongly) and then attempts made to factorise.
In 1/7 many candidates failed to take out the common factor and followed this with only one solution so losing most of the marks.
In 1/8 many candidates failed to get past a factor of 2 appearing outside the bracket.
There were few correct solution to 1/10. Most candidates who attempted this question tried to equate $y = 3$ rather than $\log_4 y = 3$ which would give $y = 4^3 = 64$. Hence $64 = a^6$ giving $a = 2$.

In 2/2 the most common error was the failure to take out a common factor (of k).
In 2/4 careless application of the formula for the radius of a circle led to an unnecessary loss of marks given that this formula is quoted at the beginning of the examination paper.
In 2/5 most candidates knew to integrate but the inclusion of a constant and the subsequent evaluation was not common.
In 2/6(c) the term unit vector seemed to be unknown by all but a small number of candidates.
In 2/8 the inability to use Pythagoras correctly was disturbing, leading in many cases to a great loss of marks as many of the ratios turned out to be greater than 1. It was disappointing to see so many wrong expansions for the double angles, the formulae for which are given at the front of the examination paper.
In 2/10 it was disappointing to see to slippage in the requirements for (a). The published marking schemes are quite clear about the necessary working that is to be shown. There is a tendency to work in degrees, whatever units the question is given in. Many candidates seem to unaware of the issues of differentiating a trigonometric function expressed in degrees.

2/11 was poorly attempted with most candidates unable to translate the question into $0.88A_0 = A_0e^{-0.000124t}$. If this was achieved then the question was generally completed correctly.
2/12 was quite well done except for the final part which required candidates to consider the end points.

Advice to centres for preparation of future candidates

Apart from the details shown in the previous section, some emphasis should be made on the formulae which are quoted at the front of the examination paper, in particular the formulae for the trigonometric expansions and the double angle formulae. It is difficult to accord much credit to a piece of work which starts off by an erroneous rule (e.g. "sin2a = 2sin$a$").
Similarly, the above comments apply to using the formulae for circle calculations.
Whilst factorising a complete quadratic was competently handled, many candidates had forgotten how and when to take out a common factor. This technique should be revised at all appropriate stages.
For candidates who find "completing the square" difficult, some consideration should be given to the method of expanding (e.g. $a(x + b)^2 + c = ax^2 + 2abx + ab^2 + c$) and comparing coefficients.

Statistical information: update on Courses

Number of resulted entries in 2005	19,173

Number of resulted entries in 2006	18,533

Statistical Information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum %	Number of candidates	Lowest mark
Maximum Mark - 130	-	-	-	-
A	24.0	24.0	4,443	101
B	23.2	47.2	4,307	83
C	21.3	68.6	3,956	66
D	8.7	77.3	1,617	57
No award	22.7	100.0	4,210	-

General commentary on passmarks and grade boundaries

- While SQA aims to set examinations and create mark schemes which will allow a competent candidate to score a minimum 50% of the available marks (notional passmark) and a very well-prepared, very competent candidate to score at least 70%, it is almost impossible to get the standard absolutely on target every year, in every subject and level
- Each year we therefore hold a passmark meeting for each subject at each level where we bring together all the information available (statistical and judgmental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the senior management team at SQA
- We adjust the passmark downwards if there is evidence that we have set a slightly more demanding exam than usual, allowing the pass rate to be unaffected by this circumstance
- We adjust the passmark upwards if there is evidence that we have set a slightly less demanding exam than usual, allowing the pass rate to be unaffected by this circumstance
- Where the standard appears to be very similar to previous years, we maintain similar grade boundaries
- An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions are different. This is also the case for exams set in centres. And just because SQA has altered a boundary in a particular year in say Higher Chemistry does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related as they do not contain identical questions
- Our main aim is to be fair to candidates across all subjects and all levels and maintain standards across the years, even as arrangements evolve and change.