edexcel
advancing learning, changing lives

Examiners' Report/ Principal Examiner Feedback

January 2011

GCE

GCE Further Pure Mathematics FP1 (6667) Paper 1

Edexcel Limited. Registered in England and Wales No. 4496750
Registered Office: One90 High Holborn, London WC1V 7BH

A PEARSON COMPANY

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Examiners' Report that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

January 2011

Publications Code UA026331

Further Pure Mathematics Unit FP1
Specification 6667

Introduction

The questions on the whole were well answered with many fully correct answers. Candidates found the paper very accessible and standard methods were well known and accurately applied. The standard of presentation was generally good with solutions showing logical steps making the work easy to follow. The questions that proved most challenging were the latter parts of question 6 and question 8, question 9 and question 10 part (b).

Report on individual questions

Question 1

This question was well done by the vast majority of candidates. In part (a) virtually all obtained the method mark but a few lost the accuracy mark for either having $-9\mathrm{i}^2$ or failing to use $\mathrm{i}^2 = -1$ when simplifying. There were a surprising number of numerical errors. In part (b) anyone who gave an answer was using the correct multiplier and most expanded and simplified correctly. A few lost the final accuracy mark for leaving their answer as a single fraction.

Question 2

Part (a) was well answered with most candidates gaining full marks. A few lost accuracy marks for sign errors but most had used the matrix multiplication method correctly. In part (b) there were many candidates correctly identifying it as a reflection. A lot of these candidates went on to give the correct line of reflection but some did give the wrong axis. Many candidates also mentioned a centre at this point which was erroneous but did not lose any credit. Candidates who failed to identify it as a reflection generally thought that it was a rotation. Part (c) was also generally answered correctly with the original matrix as the most common of the incorrect responses.

Question 3

Many candidates gained full marks for this question. In part (a) some candidates lost marks for incorrect signs and struggled with interpolation. Those with good diagrams tended to produce the best responses and a lot of variety was seen in the correct methods. In part (b) there were rarely any errors and in part (c) many were able to use Newton Raphson method correctly to gain full marks.

Question 4

In part (a) virtually all candidates wrote down the correct conjugate. In part (b) a variety of methods were used with varying degrees of success. Candidates using expansion of brackets were usually able to gain full marks provided they set out the terms carefully. Of those who used other methods, some candidates found only the product of the roots and so gained no marks here. Of those that also found the sum of the roots correctly, a significant number then gave the *p* value as 4 and so lost the final accuracy mark. Methods involving simultaneous equations were also quite common and had varying degrees of success.

Question 5

In part (a) many candidates were able to expand the brackets and use the standard formulae correctly. The most successful candidates then began factorising immediately and were usually able to gain full marks. Candidates who expanded all of the brackets found it more difficult to complete the proof. Some correct polynomial division was used and some candidates also expanded the final expression to meet in the middle. Some candidates attempted to use proof by induction here which typically gained no credit. In part (b) candidates generally gained full marks and if not, the method mark was usually awarded and then a numerical error made. A small number of candidates used $S_{50} - S_{20}$ which lost the method mark.

Question 6

Marks in part(a), part (b) and part (c) were usually gained without difficulty. Unfortunately part (d) proved more problematic but most did still complete it correctly. In part (e) most also gained the marks using the area of a trapezium. Candidates splitting it into a rectangle and two triangles had often had an incorrect answer in part(d) and so were only able to gain the method mark here.

Question 7

Part (a) was almost always gained although some candidates seemed to think it had to be plotted on fully accurate scaled axes. In part (b) most candidates were able to achieve at least the method mark and many got full marks. In part (c) the few candidates who used the $w = r\cos\theta + \mathrm{i}r\sin\theta$ method often gave correct solutions here. Many candidates were also correct using the modulus and argument but there were a lot of incorrect signs used, as many failed to refer to which quadrant contained *w* when deciding whether to use the positive or negative solutions from their quadratic. In part (d) those candidates who expanded before finding the modulus were only able to gain the method mark since they were using an incorrect *w*. Many however recovered by using the product of the moduli and gained full marks here. Candidates with part (c) fully correct usually had no problem in part (d) either.

Question 8

In part (a) most candidates gave correct solutions but some did give $\frac{1}{4}$ but then still used $\frac{1}{4}$ as $\frac{1}{ad-bc}$ in part (b) thus not following through their own determinant and displaying a confusion regarding the terminology. Most candidates did however give the fully correct inverse in part (b). In part (c) most candidates also gained full marks with a significant number of those that had an incorrect determinant still achieving the follow through mark to gain full marks here. Part (d) was generally well done. Candidates who had been fully correct in part (a) to part(c) were usually also correct here although a few lost the final mark for failing to give coordinates. A significant majority of those who had an incorrect inverse still gained the first two marks here for correct processing and a follow through mark. Some candidates however were unable to identify the correct method and some were just multiplying by **A**.

Question 9

This proved to be the most demanding question on the paper. Solutions often evaluated u_2 rather than u_1 and so lost the first mark. They were often unaware that they had not in fact found u_1 though since they had used *k*=1 in the expression for u_{k+1} and so were able to then state the four necessary elements of the method confidently and gain the final accuracy mark. There was the usual difficulty with getting the logic right, as candidates struggled to state the precise wording, probably due to a superficial understanding of the method. However, the most striking thing was the very large number of candidates who thought it necessary to show it was true for *n*=2 which did not gain any credit.

Question 10

Part (a) was usually done successfully with few candidates failing to find $\frac{\mathrm{d}y}{\mathrm{d}x}$ using a variety of successful methods. A small number omitted to show their method for gradient and as the equation was given in the question, the initial marks were lost. Part (b) proved more problematic with many candidates failing to use the most efficient method. There were some slips with signs too which meant that the final coordinates were wrong in quite a few cases. Some candidates however did achieve full marks here.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481

Email publications@linneydirect.com

Order Code UA026331 January 2011

For more information on Edexcel qualifications, please visit www.edexcel.com/quals

Edexcel Limited. Registered in England and Wales no.4496750
Registered Office: One90 High Holborn, London, WC1V 7BH