Location Entry Codes

From the June 2007 session, as part of CIE's continual commitment to maintaining best practice in assessment, CIE has begun to use different variants of some question papers for our most popular assessments with extremely large and widespread candidature, The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise. All versions of the paper give assessment of equal standard.

The content assessed by the examination papers and the type of questions are unchanged.

This change means that for this component there are now two variant Question Papers, Mark Schemes and Principal Examiner's Reports where previously there was only one. For any individual country, it is intended that only one variant is used. This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiner's Reports.

Question Paper	**Mark Scheme**	**Principal Examiner's Report**
Introduction	Introduction	Introduction
First variant Question Paper	First variant Mark Scheme	First variant Principal Examiner's Report
Second variant Question Paper	Second variant Mark Scheme	Second variant Principal Examiner's Report

Who can I contact for further information on these changes?
Please direct any questions about this to CIE's Customer Services team at: international@cie.org.uk

MATHEMATICS

Paper 0580/01

Paper 1 (Core)

General comments

Overall candidates tackled the paper well and the majority seemed to be clear about what was required in the questions. However, trigonometry and bearings were particularly noticeable as topics not covered adequately.

Presentation of work continues to improve, but showing working should continually be stressed to candidates. Many marks were lost due to lack of knowledge of basic mathematical skills resulting in the early part of the paper often scoring low marks. In contrast, the last two questions on statistics and travel graphs enabled candidates to gain a higher mark than was expected after the early poor progress.

Calculator use was at times poor and Centres should ensure that some teaching is given to enable students to appreciate when their use is appropriate. For example **Question 1** really should have been tackled without a calculator since its use often led to errors.

Some Centres allow rough paper to be used in the examination. This disadvantages many candidates who then do not show working in the provided areas. The working space should be sufficient, and considerable thought is given to this aspect in the preparation of the paper.

Comments on specific questions

Question 1

Order of operations was not observed by many candidates and the numerator was often processed in the order shown. Calculators should not have been used with such values and many using them failed to apply brackets for the denominator or worked out numerator and denominator separately.

Answer: -2

Question 2

Most candidates indicated conversion to decimals leading to a correct answer. Surprisingly, a number of candidates gave the wrong order even after correct conversion. Leaving the answers in decimal form, though not ideal, was not penalised.

Answer: 0.58 $\frac{3}{5}$ 62%

Question 3

Time continues to present problems as many candidates attempted to subtract using a calculator. Minutes over 60 were regularly seen in the answers. Generally the question was poorly done with a far higher number of incorrect responses than expected for such a straightforward question on an aspect of daily life.

Answer: 7(h) 55(min)

Question 4

Most candidates found the correct answer but some errors in manipulation of the mixed number often led to unrealistic answers. Mental, or even written estimation would have eliminated most errors, such as $\frac{1}{24}$ and 6.25.

Answer: 24

Question 5

As expected, this question was straightforward for the vast majority. Deducing correlation from a worded statement rather than a scatter graph did increase the level of difficulty.

Answer: Negative

Question 6

The vast majority identified the correct month but careless question interpretation led a considerable number to just quote the temperature for January.

Subtracting a negative number in part **(b)** presented a greater problem with many candidates not realising subtracting a negative results in addition.

Answers: **(a)** January **(b)** 26(.0)

Question 7

There were very few correct answers to the bearings question. The back bearings method of ±180° was rarely applied. Many could not identify correctly which angle represented the required bearing, resulting in many answers less than 270°. Regardless of the labelling 'not to scale' an appreciable number measured the bearing.

Answer: 325

Question 8

Vectors did not seem to have been covered in some Centres, but those who understood the topic did well on the question. Surprisingly a 2 by 2 matrix was written for **(a)** a number of times, but otherwise errors were due to incorrect signs and order of the components/coordinates.

Answers: **(a)** $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$ **(b)** (-2, -1)

Question 9

This question was very poorly done with even correct expansion usually spoilt by wrong simplifying. Some even changed the question to a 2 bracket expansion, while subtracting the x^2 terms often lost the x^2. Many candidates did gain 1 mark from partly correct answer.

Answer: $2x^2 + 3xy$ or $x(2x + 3y)$

Question 10

This was not well done but many gained 1 mark provided angle *BCD* was clearly identified. Once again many unrealistic answers were seen, often from simply adding the two given angles. Many candidates seemed unfamiliar with the 3-letter notation form of angle identification so essential in this question.

Answer: 75

Question 11

Part **(a)** was generally correct, often due to generous spelling tolerance, but isosceles was quite common. Equal was seen but not allowed as that could indicate simply a comparison of the triangles.

More problems were evident in part **(b)** with many confusing pyramid and prism. Although prism alone was accepted, there were a number of responses 'rectangular prism', which was clearly not acceptable.

Answers: **(a)** Equilateral **(b)** (Triangular) prism

Question 12

This rather more demanding question was poorly done although better candidates usually at least recognised the same coefficient of x. The same equation as the original one did not score that mark. It was quite common to see $y = 0x +$ (correct)c but this horizontal line also did not score.

Answer: (y =) $3x - 1$

Question 13

Indices were quite well known but many found part **(c)** beyond them. Some gave embedded answers which were only penalised once for the question.

Answers: **(a)** 9 **(b)** 5 **(c)** –2

Question 14

In part **(a)** more thought by candidates about whether a larger or smaller amount would result in euros could have avoided the error of multiplying. Misreading of the conversion factor also produced a number of incorrect answers.

Many did not appreciate that 3 significant figures meant 3 figures, even if the last one is zero. About half the candidates succeeded in writing the correct value.

Answers: **(a)** 208 to 210.084 **(b)** 1.20

Question 15

This was not well answered but a follow through mark for y (or x if y was done first) was common when candidates realised that $x + y = 270$. Some Centres clearly prepared candidates well on the topic of polygons, producing good scores on the question. Many assumed that x and y were equal at 135° each, without any working.

Answers: (x =) 120 (y =) 150

Question 16

The wording needed interpretation causing weaker candidates to do badly on the question. The total selling price was often given as the profit and some interpreted the total cost as the cost per metre.

Many did gain a follow through mark in part **(b)** or a consolation mark for a correct total selling price.

Answers: **(a)** 16 **(b)** 20

Question 17

Provided candidates understood standard form and did not write it as some calculators do, they usually gained both marks. The 5.1 was essential for any mark to be awarded.

Part **(b)** was well done and most chose not to give the answer in standard form. An error by some candidates was to round 29.4 before cancelling.

Answers: **(a)** 5.1×10^8 **(b)** 1.5×10^8 oe

Question 18

Again some chose to ignore 'not to scale' and assumed it was an isosceles triangle. Some Candidates did not seem to have covered trigonometry.

Part **(a)** was done well with most using Pythagoras correctly. Some confusion with trigonometrical ratios was evident in part **(b)** and often lack of working together with premature approximation lost marks. Strangely some thought that an angle was asked for in part **(a)**.

Answers: **(a)** 1500 **(b)** art 36.9

Question 19

Part **(a)** was well answered though cases of multiplying were seen.

Where candidates were familiar with the use of compasses part **(b)** was well done. A significant number did not show arcs, often leading to an inaccurate triangle.

Part **(c)** was not done well as often is the case with boundaries.

Answers: **(a)** 263 **(c)** 109.5

Question 20

Although part **(a)** was well done there was some considerable confusion over the 'averages', particularly between mean and median.

Part **(b)** was very rarely correct. The most common response was that the mean was unsuitable as it was not a whole number. It was disappointing that almost all candidates had no idea of the reasons for using different 'averages'.

Answers: **(a)(i)** 50 **(ii)** 43.9(3….) **(iii)** 47 **(b)** (Low) extreme value oe

Question 21

Careless reading of the graph caused marks to be lost in an otherwise very well done question.

In part **(a)** 3 + 6 = 9 was not then multiplied by 10 by quite a number of candidates.

The main errors in **(b)** were to give a single letter or state the first section, the longest time.

Reading of the graph was particularly poor in part **(c)(i)** but many gained the last three marks by follow through. A significant error in this part was to work out the average speed just for the moving times; that is with time 310 seconds.

Answers: **(a)** 90 **(b)** D to E **(c)(i)** 1270 to 1280 **(ii)** 3.2

MATHEMATICS

Paper 0580/01

Paper 1 (Core)

General comments

Overall candidates tackled the paper well and the majority seemed to be clear about what was required in the questions. However, trigonometry and bearings were particularly noticeable as topics not covered adequately.

Presentation of work continues to improve, but showing working should continually be stressed to candidates. Many marks were lost due to lack of knowledge of basic mathematical skills resulting in the early part of the paper often scoring low marks. In contrast, the last two questions on statistics and travel graphs enabled candidates to gain a higher mark than was expected after the early poor progress.

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Comments on specific questions

Question 1

Order of operations was not observed by many candidates and the numerator was often processed in the order shown. Calculators should not have been used with such values and many using them failed to apply brackets for the denominator or worked out numerator and denominator separately.

Answer: -5

Question 2

Most candidates indicated conversion to decimals leading to a correct answer. Surprisingly, a number of candidates gave the wrong order even after correct conversion. Leaving the answers in decimal form, though not ideal, was not penalised.

Answer: 0.79 $\frac{4}{5}$ 81%

Question 3

Time continues to present problems as many candidates attempted to subtract using a calculator. Minutes over 60 were regularly seen in the answers. Generally the question was poorly done with a far higher number of incorrect responses than expected for such a straightforward question on an aspect of daily life.

Answer: 7(h) 45(min)

Question 4

Most candidates found the correct answer but some errors in manipulation of the mixed number often led to unrealistic answers. Mental, or even written estimation would have eliminated most errors, such as $\frac{1}{24}$ and 6.25.

Answer: 24

Question 5

As expected, this question was straightforward for the vast majority. Deducing correlation from a worded statement rather than a scatter graph did increase the level of difficulty.

Answer: Negative

Question 6

The vast majority identified the correct month but careless question interpretation led a considerable number to just quote the temperature for January.

Subtracting a negative number in part **(b)** presented a greater problem with many candidates not realising subtracting a negative results in addition.

Answers: **(a)** January **(b)** 13.2

Question 7

There were very few correct answers to the bearings question. The back bearings method of ±180° was rarely applied. Many could not identify correctly which angle represented the required bearing, resulting in many answers less than 270°. Regardless of the labelling 'not to scale' an appreciable number measured the bearing.

Answer: 305

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Answers: **(a)** $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$ **(b)** (-2, -1)

Question 9

This question was very poorly done with even correct expansion usually spoilt by wrong simplifying. Some even changed the question to a 2 bracket expansion, while subtracting the x^2 terms often lost the x^2. Many candidates did gain 1 mark from partly correct answer.

Answer: $3x^2 + 2xy$ or $x(3x + 2y)$

Question 10

This was not well done but many gained 1 mark provided angle *BCD* was clearly identified. Once again many unrealistic answers were seen, often from simply adding the two given angles. Many candidates seemed unfamiliar with the 3-letter notation form of angle identification so essential in this question.

Answer: 80

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More problems were evident in part **(b)** with many confusing pyramid and prism. Although prism alone was accepted, there were a number of responses 'rectangular prism', which was clearly not acceptable.

Answers: **(a)** Equilateral **(b)** (Triangular) prism

Question 12

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Answer: (y =) $2x - 3$

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Indices were quite well known but many found part **(c)** beyond them. Some gave embedded answers which were only penalised once for the question.

Answers: **(a)** 10 **(b)** 3 **(c)** –2

Question 14

In part **(a)** more thought by candidates about whether a larger or smaller amount would result in euros could have avoided the error of multiplying. Misreading of the conversion factor also produced a number of incorrect answers.

Many did not appreciate that 3 significant figures meant 3 figures, even if the last one is zero. About half the candidates succeeded in writing the correct value.

Answers: **(a)** 225 to 226.89 **(b)** 1.20

Question 15

This was not well answered but a follow through mark for y (or x if y was done first) was common when candidates realised that $x + y = 270$. Some Centres clearly prepared candidates well on the topic of polygons, producing good scores on the question. Many assumed that x and y were equal at 135° each, without any working.

Answers: (x =) 120 (y =) 150

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Many did gain a follow through mark in part **(b)** or a consolation mark for a correct total selling price.

Answers: **(a)** 12 **(b)** 13(.3….)

Question 17

Provided candidates understood standard form and did not write it as some calculators do, they usually gained both marks. The 5.1 was essential for any mark to be awarded.

Part **(b)** was well done and most chose not to give the answer in standard form. An error by some candidates was to round 29.4 before cancelling.

Answers: **(a)** 5.1×10^8 **(b)** 1.5×10^8 oe

Question 18

Again some chose to ignore 'not to scale' and assumed it was an isosceles triangle. Some Candidates did not seem to have covered trigonometry.

Part **(a)** was done well with most using Pythagoras correctly. Some confusion with trigonometrical ratios was evident in part **(b)** and often lack of working together with premature approximation lost marks. Strangely some thought that an angle was asked for in part **(a)**.

Answers: **(a)** art 1360 **(b)** 36 to 36.03

Question 19

Part **(a)** was well answered though cases of multiplying were seen.

Where candidates were familiar with the use of compasses part **(b)** was well done. A significant number did not show arcs, often leading to an inaccurate triangle.

Part **(c)** was not done well as often is the case with boundaries.

Answers: **(a)** 276 **(c)** 119.5

Question 20

Although part **(a)** was well done there was some considerable confusion over the 'averages', particularly between mean and median.

Part **(b)** was very rarely correct. The most common response was that the mean was unsuitable as it was not a whole number. It was disappointing that almost all candidates had no idea of the reasons for using different 'averages'.

Answers: **(a)(i)** 50 **(ii)** 44.1(3….) **(iii)** 48 **(b)** (Low) extreme value oe

Question 21

Careless reading of the graph caused marks to be lost in an otherwise very well done question.

In part **(a)** 3 + 6 = 9 was not then multiplied by 10 by quite a number of candidates.

The main errors in **(b)** were to give a single letter or state the first section, the longest time.

Reading of the graph was particularly poor in part **(c)(i)** but many gained the last three marks by follow through. A significant error in this part was to work out the average speed just for the moving times; that is with time 310 seconds.

Answers: **(a)** 90 **(b)** D to E **(c)(i)** 1270 to 1280 **(ii)** 3.2

MATHEMATICS

Paper 0580/02

Paper 2 (Extended)

General comments

The level of the paper was such that almost all candidates were able to demonstrate their knowledge and ability. The paper was again challenging for the most able this year with very few scoring full marks. There was no evidence at all that candidates were short of time. The general level of performance was about the same as last year with most candidates finding some questions that they could do. Premature approximation was a major concern this year and candidates need to be aware that they should be working to an accuracy of 4sf in order to obtain answers correct to an accuracy of 3sf.

Particular Comments

Question 1

This was generally very well answered but infinity and 8 were common errors. Some candidates confused this with angle of rotation and some answers of 90 were seen.

Answer: **(a)** 4 **(b)** 4

Question 2

This was not very well answered by some candidates who, presumably, did not use the bracket function on their calculator. There were some candidates who had problems putting their answer in standard form. The exponent was often related to the number of figures in their answer to part **(a)** rather than the position of the decimal point.

Answer: **(a)** 0.176 **(b)** 1.76×10^{-1}

Question 3

A large number of candidates did not know that $0.8 \times 0.8 \times 0.8$ was required. Both 0.8 and 2.4 were common errors.

Answer: 0.512

Question 4

This was very well answered.

Answer: tan100, cos100, sin100

Question 5

This question seemed to be very challenging. Many candidates did not write their answer to part **(a)** as a fraction or if they did, they failed to simplify it. Many others failed to use 200 as the denominator.

Answer: **(a)** 1/50 **(b)** 4.35

Question 6

This was poorly done again this year with well over half the candidates failing to score any marks. It was common to see 150 rounded to various accuracies instead of looking for the limits of the 5 minutes and then multiplying by 30.

Answer: 135 165

Question 7

This question was generally well answered with only poor arithmetic causing incorrect answers.

Answer: $\begin{pmatrix} 13 & 21 \\ 21 & 34 \end{pmatrix}$

Question 8

This was generally completely correct or in quite a few cases completely wrong.

Answer: **(a)** Sets A and C unshaded **(b)** intersections shaded

Question 9

Part **(a)** was not well answered. Less than half the candidates seemed to know what an irrational number was. Fractions were common as were decimals. Part **(b)** was generally correct with just a few out of range and sometimes 63 and 69 were seen.

Answer: **(a)** e.g. π or $\sqrt{2}$ **(b)** 61 or 67

Question 10

Most candidates knew what was required and usually the denominator was correct. Incorrect cancelling was a major problem or else problems were encountered in expanding $(x – 3)^2$ and simplifying the numerator.

Answer: $\dfrac{x^2 - 6x + 25}{4(x - 3)}$

Question 11

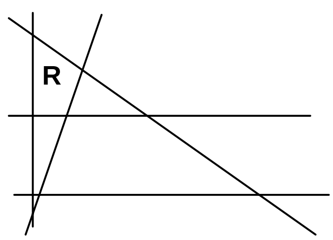
Much confusion was evident between the terms inverse and determinant. This question was not well answered.

Answer: **(a)** $x^2 - 16$ **(b)** 5 or -5

Question 12

A majority of the candidates seemed to have assumed, incorrectly, that the triangle was the correct answer and then shaded around it, rather than dealing with each inequality separately.

Answer:



Question 13

This was generally very badly done. There were a large number of candidates working with either a square relationship or an inverse one. Only the more able candidates could answer this question correctly.

Answer: 108

Question 14

This question was well attempted by most candidates and Examiners reported at least 6 different methods in use, some quite lengthy. Premature approximation was a real problem for most candidates and the accuracy mark was rarely awarded.

Answer: 7.31

Question 15

Part **(a)** was generally well done. Many candidates could not answer part **(b)**, usually due to an incorrect denominator.

Answer: **(a)** 2/3 **(b)** 1/4

Question 16

Many candidates did not recognise what this question required despite the [1] mark and they attempted to find the inverse. In part **(b)** (3x - 1)(3x - 1) was a frequent approach.

Answer: **(a)** x **(b)** $9x - 4$

Question 17

This was generally well answered with very few candidates scoring no marks.

Answer: **(a)** 2½ **(b)** -1

Question 18

This was reasonably well attempted but very few candidates scored all 4 marks, usually due to an error in dividing by 2 in the rearrangement part of the question.

Answer: **(a)** $y = -1.5x + 4$ **(b)** -1.5 **(c)** (0, 4)

Question 19

This was generally well done The working in part **(b)** was often poorly set out or inadequate.

Answer: **(a)** $w = 26x = 128$ **(b)** 52

Question 20

Most candidates scored marks on this question. In part **(a)** the construction of the perpendicular bisector was not always clearly shown.

Answer: **(a)** perpendicular bisector of AB **(b)** circle centre D radius 3 cm **(c)** 326 m

Question 21

This was generally well done. Part **(b)** was not accurately evaluated by a large number of candidates. Some of the areas under the graph were counted twice or left out completely. A few candidates misread the scales and a few tried to use distance = speed × time. It was very difficult to follow some of the working.

Answer: **(a)** 0.6 **(b)** 1170

Question 22

Simple interest is well understood although some answers only showed the interest. Compound interest is yet to become fully understood. Those quoting formulae generally got it wrong whereas those adopting a year on year approach generally made rounding errors or arithmetic mistakes. Many used simple interest again in this part.

Answer: **(a)** 2300 **(b)** 8.64

Question 23

This question seemed to bring out the worst of the premature approximation and haphazard explanations. Most candidates seemed to have some idea of what was required but full marks were very rarely awarded. In many cases the factor of ½ was used for both the circle and the semicircle. Various combinations of 3, 6 and 12 were in use for the radius. Explanations were not very clear by many candidates which made it difficult to award marks at times.

Answer: **(a)** 14.1 **(b)** 24.8

MATHEMATICS

Paper 0580/03

Paper 3 (Core)

General comments

The paper this year was felt to be comparable with previous years and enabled candidates the opportunity to demonstrate their knowledge of Mathematics in a positive way. The vast majority were able to use the allotted time to good effect and were able to complete the paper to the best of their ability with few questions not attempted. The standard of presentation and amount of working to show the methods used was generally good although as usual there is always room for improvement in this area. Working was considered essential in **Questions 2(a)(b)(c)(d)**, **3(c)(d)**, **6(c)**, **9(d)** and useful in **Questions 1(c)**, **3(a)**, **6(a)(b)**, and **9(c)**. Method marks were available in these questions. **Questions 6** and **8** proved to be the most demanding whilst **Questions 5**, **7** and **9** were the high scoring questions. A detailed breakdown of individual questions follows.

Question 1

(a) (i) This was generally correct but 5 and 0 were common errors.

(ii) This was generally correct but 8^2 and 4096 were common errors.

(iii) This was generally correct but 4^3 and 8 were common errors.

(iv) A significant number of candidates failed to appreciate the concept of an integer and simply gave the answer of 5.83 instead of 6.

(b) (i) The term "common factor" was well understood with the majority of candidates able to answer correctly.

(ii) The term "common multiple" was less well understood with the factor of 2 being a very common error. The answers of 60 and 120 were the usual correct answers seen.

(c) (i) This part proved quite demanding for the majority of candidates and there was little evidence of working or method. A list of factors (1, 2007, 3, 669, 9, 223) or expressing as a product of primes ($3 \times 3 \times 223$) would have helped. The alternative trial and improvement method of dividing by square numbers to see which one was a factor did not appear to have been used.

(ii) The correct factor of 3 was often seen but few candidates were able to also give the factor of 223. Again there was little evidence of working or method and although expressing 2007 as a product of prime numbers was not specifically asked for it would have enabled candidates to answer the question rather better. The number 1 was a common error though not prime.

Answer: **(a)(i)** 1 **(ii)** 8 **(iii)** 4 **(iv)** 6 **(b)(i)** 3 **(ii)** any multiple of 60 **(c)(i)** 9 **(ii)** 3 and 223

Question 2

(a) Candidates do need to be aware that if a question asks them to "show that" a result is true, the calculation has to be done as if the result is not known and then a statement of the required result is also written down. Hence both parts of the working, $2/7 \times 336 = 96$ and $336 - 96 = 240$, were required (or the alternative $5/7 \times 336 = 240$) and not just $336 - 96 = 240$ or $240 + 96 = 336$. The majority of candidates who did use and show an appropriate method did so correctly.

(b) This was generally well answered although the common error of 240 ÷ 5 = 48 was seen

(c) The comments for part **(a)** are even more relevant here, and this part was less successful. A significant number simply stated 60 × 12 = 720 with no reference to where the 60 came from. Others simply stated the circular argument of, “720 ÷ 12 = 60, 60 × 12 = 720“.

(d) Although on the syllabus many candidates appeared to have little knowledge of the correct method to use when calculating compound interest. Those who did generally obtained the correct answer. A significant number simply gave the simple interest of 86.40 or the total of 806.40.

Answer: **(a)** 240 correctly shown **(b)** 100 **(c)** 720 correctly shown **(d)** 808.99

Question 3

(a)(i) This was generally answered well although the common error of 1800 (from $(5 \times 12)^2$) was seen.

(ii) This similar substitution into a given equation was less well done. The initial simplification of ½ × 8 (= 4) was rarely seen, with the resulting transposition often being x (8/2) not x (2/8). The use of 225 - 4 = 221 was another common error.

(iii) The algebraic manipulation involved in changing the subject of this formula caused problems for many candidates. The possible first line of $2E = mv^2$ was rarely seen. A significant number gave the ambiguous answer of $m = E \div v^2 \div ½$

However most candidates were able to gain one mark by either dividing by v^2, dividing by ½ or by multiplying by 2. Another common error was to attempt to take the square root of their expression.

(b) The required factorisation was generally done well although a small number of candidates only found one of the two common factors.

(c) Most candidates were able to expand the brackets correctly and so earn the first mark. The simplification and/or transposition then caused problems for some candidates with $9x$, $3x$, 43, -43 and -13 being common errors. Those candidates who correctly obtained the expression $13 – 3x$ (= 7) generally went on to solve the equation correctly.

(d) This question on simultaneous equations was well answered by the majority of candidates although a number of numerical errors were seen. The most common method used was elimination, followed by substitution, with a small number using a solution by trial method.

Answer: **(a)(i)** 360 **(ii)** 7.5 **(b)** $xy(y – x)$ **(c)** $x = 2$ **(d)** $x = 3$, $y = 1$

Question 4

(a)(i) This was generally well answered by the vast majority of candidates.

(ii) The graph was generally well drawn although a small number were perhaps a little careless in reading the scale when plotting the points. A small but significant number of candidates drew part of the curve in the wrong quadrant or drew a curve in all four quadrants. A small number also joined the two parts of the curve with a straight line. The quality of the curve drawn was generally good although “curves” consisting of a series of straight lines were seen.

(b) This part on rotational symmetry was generally answered poorly with 1 and 180º being the common errors.

(c) The lines of symmetry were generally correctly and accurately drawn although a significant number only drew one line.

(d) (i) Generally those candidates with a correct diagram were able to answer this part of the question correctly. However incorrect reading of the scale by a number of candidates was evident with 20.5 being a typical incorrect answer.

(ii) Few correct answers were seen with little evidence shown on how to form an equation from a line or the use of $y = mx + c$.

(e) Again very few correct answers or indications of the use of a correct method were seen.

Answer: **(a)(i)** -10, -20, -60, 30, 20, 15 **(b)** order 2 **(d)(i)** (2. 5, 25), (-2. 5, -25) **(ii)** $y = 10x$ **(e)** -10

Question 5

(a) (i)(ii) This was generally well answered

(iii) The vast majority of candidates were able to draw the required pie chart correctly within the accuracy required. Only a few candidates failed to label their diagram.

(b) (i)(ii)(iii) This question on probability was well understood by most candidates and correct answers were given in fractional form. Only a few candidates gave (acceptable) answers in decimal or percentage form although this did seem to cause them extra problems in part **(d)**. A common error in part **(ii)** was 14/24.

(c) (i)(ii) An unfortunate number of candidates tried to relate this part of the question to the rest of the question and gave answers relating to the coloured discs. Many others felt that a descriptive answer was required and gave examples of impossible and certain events. Few correct numerical answers to the probability of impossible and certain events were seen.

(d) Many candidates did not seem familiar with the use of a probability scale and few totally correct answers were seen.

Answer: **(a)(i)** 135 **(ii)** 75 **(b)(i)** 10/24 **(ii)** 15/24 **(iii)** 19/24 **(c)(i)** 0 **(c)(ii)** 1

Question 6

(a) (i) As stated in previous comments this “show that” question caused problems. The statement “56 + 62 + 62 = 180” is insufficient to answer this type of question. Another common error was to state “56º + 6m = 62º”. Having said that this part was generally well answered. However many candidates used incorrect mathematical notation, with particular reference to the use of the equality signs and gave statements such as “180 – 56 = 124 ÷ 2 = 62”. Whilst not penalised this should be discouraged.

(ii) Unfortunately a number of candidates did not recognise the use of trigonometry in this part of the question. Candidates who correctly used 6cos62 often truncated their answer to 2.8 or 2.81 instead of the correct answer of 2.82. The rubric does ask for 3 significant figures.

(iii) The vast majority correctly doubled their previous answer and were awarded the mark on a follow through basis.

(iv) Those candidates who used 6sin62 were generally correct. Pythagoras was a common alternative method used but often again resulted in a lack of accuracy, or the two square numbers were incorrectly added rather than subtracted.

(b) (i) This was generally well answered with most multiplying the correct dimensions.

(ii) This was generally well answered as correct or a correct follow through answer. However, common errors in neglecting to divide by 2 to find the required area or the incorrect use of $2\pi r$ were seen.

(iii) This was generally well answered, again on a follow through basis, although a significant number failed to appreciate the use of the term “cross section” and used a variety of incorrect formulae rather than add together their previous 2 answers.

(c) (i) This was generally well answered although a small number failed to use the correct formula for volume or to appreciate the use of the cross section previously calculated.

(ii) This part was poorly answered by the majority of candidates. Very few appreciated that the given speed of 60 kilometres an hour is equivalent to the speed of 1 kilometre per minute and thus were unable to use the simple calculation required to answer the question. Most candidates tried to obtain the result by using a formula, and although 8.33 from 500 ÷ 60 was common, the majority were unable to deal with the different units involved or to convert to the required unit. A number attempted to use the volume from the previous part.

Answer: **(a)(i)** (180 - 56)/2 **(ii)** 2.82 **(iii)** 5.63 to 5.64 **(iv)** 5.30
(b)(i) 29.8 to 29.9 **(ii)** 12.5 **(iii)** 42.3 to 42.4 **(c)(i)** 21100 to 21200 **(ii)** 30

Question 7

(a) Most candidates correctly identified the shape as a trapezium, although there was a great variety of incorrect responses seen.

(b) (i) This was generally well answered although there was a number of minor slips in the counting of squares. A small number did the translation of 3 across and 9 up in error.

(ii) This was generally well answered although a small number were 1 square out horizontally.

(iii) This was generally well answered although the least successful of the first three transformations asked for. Common errors included incorrect use of point A, rotation of 90º clockwise and rotation of 180º.

(iv) This was generally well answered in the sense that enlargements of scale factor 3 were drawn. However most candidates were unable to correctly use the given centre of enlargement of point *O*.

Answer: **(a)** trapezium **(b)** correct diagrams drawn

Question 8

(a) (i)(ii)(iii) This was generally well answered by the majority of candidates. However the point *Q* did end up at a surprising assortment of positions.

(iv) Very few correct and full answers were seen to this part with many candidates attempting to use the tangent property again or simply stating that it was a right angled triangle. The response of "the angle in a semi-circle is 90º" was rarely seen.

(b) (i) A significant number of candidates were unable to attempt parts **(b)** and **(c)** of this question. The perpendicular bisector of *QR* when constructed with the correct arcs was generally correct and within the limits of accuracy set.

(ii) Candidates did not seem so familiar with the angle bisector construction and this part was less successful. Arcs seen were less common and often answers were inaccurate. A small number of candidates bisected the wrong angle.

(c) As the required region was dependent on part **(b)** few correct answers were seen. However those candidates who were able to correctly construct the two required lines were generally able to identify and shade the correct region.

Answer: **(a)(i)** diameter from *P* through *O* to *Q* **(ii)** 90º **(iii)** *P* to *R* and *Q* to *R* ruled
(b)(i) perpendicular of *QR* drawn with arcs
(b)(ii) bisector of angle *PRQ* drawn with arcs
(c) correct shading

Question 9

(a) This was generally well answered with the only errors being in the lengths of one or more of the lines.

(b) This was generally well answered with the vast majority recognising and using the difference between terms of 7.

(c) (i) This was generally well answered although $36 \times 2 = 72$ was a common error.

(ii) The move to the use of algebra to define the *n*th term caused problems for a significant number of candidates. $7n + 1$ or the less frequent alternative of $8 + (n - 1) \times 7$ were only seen from the better candidates. Common errors included $n + 7$, $7n$, 113 and +7.

(d) Few candidates were able to state and then use the equation $7n + 1 = 113$ to find the value of n. However many were able to obtain the correct value by a variety of alternative methods.

Answer: **(a)** E correctly drawn **(b)** 22, 29, 36 **(c)(i)** 71 **(ii)** $7n + 1$ **(d)** 16

MATHEMATICS

Paper 0580/04

Paper 4 (Extended)

General comments

The paper seemed to follow last year's level of difficulty, with a few questions of a less predictable nature proving to be demanding. The mensuration question was found to be particularly difficult, probably because it involved changing units and rates of flow. The difficulties elsewhere appeared to be as a result of combining topics in a single context or where the question did not follow the usual pattern. The questions on trigonometry, transformations, statistics and algebraic equations were generally well received and the investigative question at the end of the paper was also quite well done.

Candidates were well prepared for the standard topics and applications involving them. Very good knowledge of formulae and techniques were demonstrated. Many candidates found situations of a slightly unusual nature more challenging and the changing of units was frequently badly done, especially those involving time, area and volume.

There seemed to be sufficient time to complete the paper, although a few scripts suggested some rushing in the final question. However, the nature of this final question did lead to more "trial and improvement" working and it is not easy to distinguish between this working and rushed working.

The presentation of work continued to be of a high standard and all but the weakest candidates seem to be well aware of the availability of marks for method even when answers are incorrect. It is pleasing to note that if candidates know a method they are prepared to communicate this clearly.

The accuracy of work was also of a high standard, with most candidates using at least three significant figures throughout. It was also evident that there was efficient use of calculators during calculations of more than one step. A small number of candidates approximated too much during the working and lost final accuracy marks.

Most candidates followed all the rubric instructions but it is worth offering reminders that all working and answers should be together and all parts of graph questions are usually to be done on a sheet of graph paper. Candidates should also be advised not to cross out working unless they replace it.

Another point to make is the use of the number of marks allocated to a question. Candidates should develop the skill to recognise how much work to expect to do for a particular number of marks. For example, in **Question 3(a)(i)**, some candidates found a perpendicular height using right-angled triangle trigonometry and then used $\frac{1}{2}$base × height to find an area, when two sides and the included angle were given and the question was worth only two marks.

The majority of candidates could cope with the demands of this paper but some would have been much better suited to taking the Core examinations which would have given more positive achievement.

Centres are reminded that suitable booklets or paper are important to the candidates and that graph questions are set to be done on 2 mm paper and other varieties of graph paper can disadvantage candidates. When using separate sheets, Centres should use treasury tags and not staples or paper clips.

COMMENTS ON INDIVIDUAL QUESTIONS

Question 1

This question was not the usual one on percentages, ratio etc., although a harder ratio situation was set up with map scales. Candidates generally understood the concepts being tested, with the exception of areas on maps, but many had difficulties with units.

(a) (i) Almost all candidates had the correct figures in the answer but many were incorrect by factors of powers of ten. This demonstrated an understanding of the need to multiply but an inability to cope somehow between kilometres and centimetres.

(a) (ii) Many did not realise the need to square a scale factor for area and used the same factor as in part **(a)**. Some took the square root of 13 and correctly worked with lengths but when they calculated the area they lost the exact answer.

(b) (i) Those who succeeded in part **(a)(i)** also succeeded here, while others repeated the problem of converting between kilometres and centimetres.

(b) (ii) Almost all candidates scored the method mark for dividing the distance by a time but many converted a correct time in hours and minutes into an incorrect time in hours. 2 hours and 8 minutes was often seen as 2.08 hours. A small number of candidates even gave the time between 11 55 and 14 03 as 2 hours 48 minutes. Some candidates worked in minutes often with success but some gave a final answer in km/min, overlooking the need to multiply by 60 when using this approach.

Answers:	**(a)(i)**	2400 km	**(ii)**	520 000 km^2
	(b)(i)	1 : 5 000 000	**(ii)**	738 – 742 km/h

Question 2

This transformation question was generally well received and only the more demanding part **(f)** involving a shear was found to be more challenging. The only other problem was when candidates did not read part **(d)** correctly and performed the transformation on the original triangle *ABC* and not the triangle $A_1B_1C_1$ in spite of this being in bold on the question paper. It is important that candidates realise that anything printed in bold in a question paper is flagging up something needing special care or attention. It is pleasing to note that the majority of the candidature can handle transformations very well.

There was a clear division between those candidates who could do the basic parts of the transformation syllabus in parts **(c)**, **(d)** and **(e)** and the stronger candidates who coped with the matrices aspect and a more difficult transformation on part **(f)**.

(a),(b) Drawing axes and an object figure were two accessible marks for all but the very weakest candidates.

(c) This reflection was well done by most candidates and there were very few errors made by those who recognised the mirror line. There were, however, reflections carried out in lines such as one of the axes, instead of the line $y = x$.

(d) This rotation was also generally well done, even by those who had made a mistake in part **(c)**. The main error in this part, as already stated, was to rotate triangle *ABC* and not triangle $A_1B_1C_1$. Another less frequent error was a rotation in the wrong direction.

(e) This part was well answered by candidates who had succeeded in parts **(c)** and **(d)**, with the only error seen being writing the *y*-axis as $y = 0$. Candidates who made errors in parts **(c)** or **(d)** did not usually succeed with this part.

(f) (i) Many were well prepared for this part of the syllabus and some multiplied the triangle's column vectors by the matrix while others appeared to recognise the matrix's transformation.

(ii) Again, many were well prepared, some recognising the transformation from their drawing and others demonstrating their knowledge of standard matrices. The shear was usually recognised but the invariant line proved to be more searching and it should be noted that the phrase "invariant line" is required in the description of a shear. The stronger candidates also gave the shear factor.

(iii) Again, a variety of methods was seen and it was pleasing to see the use of the unit vector approach, as well as the recognition and calculation of the inverse matrix. Some candidates attempted to solve a set of four simultaneous equations, usually without success.

Answers: **(c)** Triangle with vertices at (1, 2), (1, 5) and (3, 3).
(d) Triangle with vertices at (-2, 1), (-5, 1) and (-3, 3).
(e) Reflection in the y – axis.
(f)(i) Triangle with vertices at (2, -1), (5, -4) and (3, 0).
(ii) Shear, y – axis invariant (with factor 1 or -1).
(iii) $\begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$.

Question 3

This long question involved trigonometry, circle angle properties, similar triangles and a quadratic which did not factorise. However it was perhaps the best done question on the paper, especially the use of general triangle trigonometry, and it is worth noting that most candidates did cope with this question covering several topics whilst they were much less successful in other questions which had mixed topics.

(a) (i) Most candidates recognised the need to use the $\frac{1}{2}ab\sin C$ formula and were able to calculate the correct area. Quite a number used a much longer approach, finding a height and then using $\frac{1}{2}$ base × height. The weaker candidates tended to use $\frac{1}{2}$ base × height with the sides AX and BX.

(ii) The comments in part **(i)** also apply here, with good use of either the sine formula or the cosine formula seen, whilst the weaker candidates used Pythagoras in a triangle without a right angle.

(iii) Most candidates realised the circle property and gave the correct answer but some found the reason more difficult. A number incorrectly thought that the angles were alternate.

(iv) The majority of candidates either obtained a correct answer or a correct follow through answer.

(v) The majority of candidates gave the correct answer "similar" but a number did think the triangles were "congruent".

(vi) Many candidates chose to use the sine rule (successfully), overlooking the use of similar triangles following from part **(v)**. There were some errors in the pairings by those using this ratio method, but most candidates found this to be a quick and straightforward method.

(b) (i) This proved to be the hardest part of this question, with candidates going straight to the next part or trying to guess at which pairs of brackets would lead to the correct equation. However, some excellent solutions were seen, with every step clearly communicated.

(ii) Candidates were well prepared to use the quadratic equation formula (or to complete the square) and most were able to apply it accurately. There were a few sign or rounding slips and, to a lesser extent, a few only divided part of the numerator by $2a$. Most candidates gave their answers to two decimal places as required.

(iii) Most candidates picked up this easy mark for substituting a positive answer from part **(ii)** into $2y - 1$.

Answers: **(a)(i)**	539.6 – 540 cm^2.	**(ii)**	49.2 or 49.16 – 49.18 cm.				
(iii)	55°	**(iv)**	33°	**(v)**	similar	**(vi)**	30.2 cm
(b)(ii)	-0.45, 4.45	**(iii)**	7.9(0) cm				

Question 4

Only the stronger candidates coped well this question, which tested functions in a different way. Many did not understand the notation and could not distinguish between finding a value of a function and finding a value of the variable for a given value of the function. The fact that the graph was given made the question more efficient for the better candidates but removed some easy graph drawing marks for the weaker candidates. It was evident that many candidates could not interpret the questions and so could not find the information from the given graph. It was pleasing to note that scale reading errors were rare.

(a) Both parts were quite well done and some candidates gained marks only in this part of the question. However, a number of candidates solved $f(x) = 0$ and $f(x) = 8$.

(b) Candidates who did try this part often only gave one answer in part **(i)**, when the allocation of two marks should have suggested more. The reverse of the error seen in part **(a)** was also seen. A few candidates wrote the same answers down for part **(a)(i)** and part **(b)(i)**, demonstrating a poor understanding of function notation.

(c) Only the more able candidates gained marks here and often only one of them.

(d) Again, only the more able were successful. Quite a common error was to use the two values from part **(c)**, again showing confusion between x and $f(x)$.

(e) There was more success in part **(i)** and it was pleasing to see many answers in the form $y = mx + c$. An amount of guesswork was evident in part **(ii)**, although the stronger candidates had clearly used their straight line and the given graph carefully.

Answers: **(a)(i)**	3	**(ii)**	–4.25 to –4
(b)(i)	–1.6, 2, 8.6 to 8.63	**(ii)**	9.2
(c)	–9, 3		
(d)	$0 < x < 6$		
(e)(i)	(y =) $1 - x$	**(ii)**	3

Question 5

This question contained straightforward mathematics but candidates found it difficult to switch from trigonometry to vectors. In previous years vector questions of this type have been answered more successfully. Many candidates picked up marks at the beginning of the question and then lost their way. The better candidates appeared to find the whole question rather easy and many picked up full marks without the need for much working.

(a) Most candidates scored full marks, using Pythagoras accurately, explaining clearly how to arrive at 48 cm. Some used trigonometry, which led to rounding issues but these were allowed.

(b) (i) This part was generally well done, although often using general triangle trigonometry instead of using a right-angled triangle and doubling an answer.

(ii) This was often successfully done, although often by using trigonometry again instead of simply subtracting the previous answer from 180. Candidates should have realised there must be a quick solution as the question carried only one mark.

(c) Many candidates simply could not move into vectors in this context and were unable to do these two one mark parts, which were expected to be very straightforward and a lead into parts **(d)** and **(e)**.

(d) Surprisingly quite a number of candidates demonstrated a vector sum equal to $\overrightarrow{OE}$ and gained a method mark for what seemed to be a harder concept than that needed in part **(c)**.

(e) The same comment applies to this part, although more candidates left this question out or seemed to have more directional problems, such as thinking that the vector $\overrightarrow{ME}$ was the same as the vector $\overrightarrow{EM}$.

(f) Again, the context of the question appeared to confuse many candidates and they were unable to connect the length of 24 as being the *y* – component of the vector **p** in **(i)** and this usually led to no attempt at **(ii)**. The better candidates usually gained full marks and used good notation, although alternatives were condoned.

(g) Some candidates realised the meaning of the magnitude notation together with the fact that only one mark was being awarded and gave the correct answer. Others carried out lengthy calculations, usually without success. Some gave a vector as their answer.

Answers: **(b)(i)** 147° **(ii)** 32° - 34° **(c)(i)** **p** + **q** **(ii)** **q** – **p**

(d) **p** + 3**q** **(e)** 0.5**p** + 2.5**q** **(f)(i)** $\begin{pmatrix} 0 \\ 24 \end{pmatrix}$ **(ii)** $\begin{pmatrix} 7 \\ -24 \end{pmatrix}$

(g) 50

Question 6

This statistics question was found to be much more of a standard type of question and most candidates scored at least quite well. Only the weaker candidates had little idea of topics such as calculating a mean from a frequency table or drawing a cumulative frequency graph.

(a) This was well done, with very few errors. These tended to be giving the answer as a mid-value or the frequency of the correct interval. A few candidates wrote down the interval and the frequency, leaving an ambiguous answer with a choice and this was not rewarded.

(b) Most candidates worked through this very efficiently and scored full marks or at least the three method marks, where one or two computational slips were condoned. Errors included the use of upper (or lower) boundaries or even interval widths instead of mid-values. Some weaker candidates divided 200 by 8.

(c) This was generally well answered and largely most accurately. It appeared that a few candidates may have answered this part on the question paper and it should be noted that an accurate graph in part **(d)** can not earn marks for part **(c)**. Another error in this part was the calculation of frequency densities instead of cumulative frequencies.

(d) There were many accurate graphs earning full marks and it is pleasing to note that the majority of candidates used the upper boundaries for their horizontal co-ordinates. The most common error, however, was the use of mid-values for horizontal co-ordinates and this led to incorrect answers in parts **(e)** and **(f)**. Quite a number of weaker candidates drew frequency graphs or some type of bar chart. Clearly parts **(e)** and **(f)**, which follow, were entirely dependent on the curve, unless some sort of interpolation was used.

(e) (i) This was usually correct.

(ii) This was generally well done, although there was evidence of a lack of knowledge of what a percentile is.

(iii) Again, this was generally well done, although many candidates misunderstood “at least” and gave the opposite answer, i.e. not subtracting their reading from 200.

(f) Often well done, but a similar error to that in part **(e)(iii)** occurred more frequently, with candidates subtracting from 200 when it was not needed.

Answers: **(a)** $1.5 < x \le 2$ **(b)** 1.73 (or 1.7275, 1.728, 1.727)
(c) 8, 35, 80, 130, 169, 190, 197, 200
(e)(i) 1.65 – 1.75 **(ii)** 1.5 **(iii)** 23 – 29 (integers only)
(f) 54 – 56.5 %

Question 7

This proved to be more difficult than anticipated and this appeared to be due to problems in understanding the concept of rate of flow and problems in converting units. There also seemed to be difficulties in realising that parts **(c)** and **(d)** were independent of parts **(a)** and **(b)** and of each other. It was surprising to see a cylinder coming in to the working of part **(d)** which referred to the channel and the channel was quite clearly defined at the beginning of the question.

(a) Many candidates did not realise that the number of cubic metres in one hour was in fact equivalent to a cuboid. The 0.8 was frequently used in this part often together with the 0.3, thus somehow using two heights. Even an inability to multiply by 60 to change the metres/minute into metres in one hour was frequently seen. Quite a number of weak candidates, being of core level ability, actually succeeded in this part and so it is quite difficult to assess why so many candidates found this part such a problem.

(b) Those candidates who could do part **(a)** could at least start this part and collected the first mark for the volume in one hour. Many continued with success but common errors were to use the volume in one hour from this part as the denominator or to find the new volume as a percentage of the volume in part **(a)**, instead of the increase in volume as a percentage. A number of candidates gained follow through marks by correct percentage calculations using incorrect volumes. A few strong candidates used the shorter method of comparing the heights and rates of flow without using volume per hour.

(c) In spite of millimetres being written in bold, many candidates made errors through changing units, especially those who changed cubic metres to cubic millimetres, rather than simply change the millimetres to metres, as the question implied. The cross-sectional area of the cylinder was occasionally given as $2\pi r$.

(d) As mentioned above, the volume of a cylinder frequently appeared in this part. A more common error was to use the area of the end of the tank instead of the perimeter, thus often equating a volume to an area. The dividing of \$50.40 by \$0.12 was often seen, with many candidates scoring this one method mark and nothing more.

Answers: **(a)** 64.8 **(b)** 1230 % **(c)** 22.1 m **(d)** 150 m

Question 8

This was a demanding question but contained nothing out of the ordinary. Most candidates were able to attempt several parts, especially writing down the two fractions in parts **(a)** and **(b)** and also solving the quadratic equation. The algebraic manipulations in part **(c)** were demanding and the context of all the sweets in a pack was often misunderstood in **(f).**

(a), **(b)** These two parts were usually well done, although the inverses of the fractions were occasionally seen.

(c) This setting up and simplifying of an equation was found to be demanding but there were many excellent solutions which showed every step clearly. The 0.8 added an extra difficulty but most candidates held this back until their final steps and gained full marks. Many candidates appeared to prefer this standard, albeit challenging, algebraic processing to the more numerical problem-solving questions where the context seems to cause problems.

(d) Finding a pair of numbers to give the product of -525 and the sum of 4 seemed to cause many difficulties and candidates often resorted to using the formula and this usually resulted in only one mark for **(ii)**, although a few of these candidates were able to give the factors from the roots.

(e) This depended on an answer in part **(d)** and, if this was the case, then $x + 21$ was usually correctly found.

(f) Many candidates divided 105 by their answer to part **(f)**, while many others found two means from parts **(a)** and **(b)** and then found their average.

Answers: **(a)** $\frac{105}{x}$ **(b)** $\frac{105}{x+4}$
(d)(i) $(x+25)(x-21)$ **(ii)** -25, 21
(e) 46 **(f)** 4.57

Question 9

Comments from Centres suggest that, overall, this investigative type **Question 9** was favourably received. Most candidates could score some quite easy marks whilst only the better candidates could score full marks, with part **(c)** being a good discriminator.

(a) This was a very easy first mark and most candidates were successful. There were slips of putting in a row or a column too many.

(b) (i) p was usually correct but many candidates did not see one of the patterns leading to q, with the next square number of 36 often being given.

(ii) x was found to be easy, and y was also often found correctly, but z proved to be more difficult, in the same way that q had been in part **(i)**. There were several ways of arriving at the expression for z but it appeared that there was a lack of experience in this type of question.

(c) (i) Only the better candidates seemed to connect substituting the 1 to give an answer of 4 and so this mark was often lost.

(ii) The same problem occurred here and a method mark was often gained for substituting the 2 but the expression was either not equal to anything or was put equal to 12 because the “total” in bold had been overlooked.

(iii) Quite a number of candidates omitted parts **(i)** and **(ii)** but still attempted this part, often with success. However the fractions seemed to cause problems and many candidates could not multiply through a whole equation. The fractions seemed to encourage the substitution method but this did not make the question any easier. There was also a tendency to convert to decimals often leading to incorrect three figure answers. The stronger candidates had no problems whatsoever in a routine situation.

(iv) Many candidates appeared to make a guess at this answer but those who had part **(iii)** correct often managed to find the answer, although there were some numerical slips. Some candidates obtained the correct answer by simply adding up the first 10 numbers in the sequence.

Answers: **(b)(i)** 25, 40 **(ii)** n^2, $(n + 1)^2$, $2n(n + 1)$
(c)(iii) $f = 2$, $g = \frac{4}{3}$ **(iv)** 880