Examiners' Report January 2007

GCE

A Level Mathematics B (7361)

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Mathematics B

Specification 7361

Paper 1

Introduction

There was no evidence that candidates did not have enough time for this paper. However, some questions proved to be quite challenging to a significant number of candidates and, as a consequence, the paper was not as straightforward as some previous papers.

Centres would be well advised, for future examinations, to focus their candidate's attention on the following topics:

- Symmetry of figures
- Finding angles **and giving textual reasons** in geometrical drawings
- Total surface areas of solid figures
- Using surds.
- Percentages, particularly 'reverse' percentages.
- Probability of more than one event
- Surface areas and volumes of geometrical solids
- Three dimensional trigonometry

It should be pointed out that the methods identified within this report may not be the only legitimate methods for correctly solving the questions. Alternative methods, whilst not explicitly identified, earn the equivalent marks. Some candidates use methods which are beyond the scope of the syllabus and, where used correctly, the corresponding marks are given.

Report on Individual Questions

Question 1

Many candidates are well drilled in the technique of factorisation of a quadratic and despite some sign slips, many correct methods (M1) were seen leading to the required answer of $(3x - 2)(x - 1)$ (A1). A significant number of candidates still feel the need to solve an equation when they see a question like this. Subsequent working of this nature, following the required answer, was ignored. However, those candidates whose first line of their solution started with a substitution into the quadratic formula earned no marks at all as no factorisation was seen in their answers.

Question 2

Despite the fact that this type of question is not set often, the more able candidate's responses were generally good. A line drawn from -2 and ranging to the left (B1) was seen on many scripts and it was encouraging to see that many candidates knew the correct symbol at -2 for the open interval (B1).

Question 3

The required answers of (a) 0 (B1) and (b) 2 (B1) were not seen as often as expected. Indeed, many weaker candidates seem to have no idea of what was required. Centres would be well advised to focus on practical techniques which would enable candidates to determine the right answers to symmetry questions rather than by using a method of simply looking at the diagram and somehow guessing at the answer.

Question 4

Candidates are generally well drilled in algebraic techniques and, except for the occasional sign slip in evaluating $-x(x + 3)$, this algebraic manipulation question was well done by many candidates. Many correct statements of the form $x(1 - x^2 - 3x)$ (M1) were seen leading to the required answer of $x - x^3 - 3x^2$ (A1).

Question 5

Again, a question which was well done by many candidates with the required answer of a 3 by 2 matrix (B2) seen on many scripts. One error, following an arithmetical slip, led to a penalty of one mark. More than one error and no marks were awarded. Very few candidates scored zero for this question.

Question 6

Differentiating one term correctly (M1) did not prove to be too difficult for many able candidates but understanding the process of differentiation proved to be elusive to many weaker candidates. As a result, getting both terms correct to arrive at the answer of

$\frac{2x}{3} + \frac{6}{x^3}$ (A1), was not seen often as many candidates made errors, particularly with the second term. Some candidates used the quotient rule and whilst this is a correct alternative method and quite commendable, the proportion of candidates who got the technique wrong compared to those who got it right suggests that it is not a method to be promoted at this level.

Question 7

Weaker and average candidates found this question much too difficult and it was rare to see a correct solution from such candidates. More able candidates, however, showed good method in this question and many correct attempts to multiply out the bracketed terms (M1) were seen. Collecting the terms together to arrive at the required answer of $2 + 2\sqrt{5}$ (A1) proved to be problematic to some candidates.

Question 8

Candidates are well drilled in the technique of standard constructions and candidates of all abilities were able to demonstrate good technique in their responses. Many were able to draw a perpendicular line through the midpoint of *AB* (M1) and give an accurate line within the required degree of accuracy (A1).

Question 9

Simply rearranging the equation $y = 4x + 1$ to $4x = y - 1$ was enough for method (M1) and many candidates completed the requirement to give the answer of $(x - 1)/4$ (A1).

Question 10

Many candidates recognised that they needed to use $\pi \times 5^2 \times 15$ in some context (M1).
However, this was then sometimes spoilt with the use of an incorrect formula for the volume of a cylinder. Curiously, $2\pi \times 5^2 \times 15$ was a common incorrect expression used and whilst this invariably led to the required answer, only one mark was awarded. Candidates were expected to divide the volume of the first cylinder ($\pi \times 5^2 \times 15$) by the area of the base of the second cylinder ($\pi \times 10^2$) (M1) to arrive at the required answer of 3.75 cm (A1).

Question 11

Many correct answers of 671.392 (B1) were seen in part (a) but, curiously, many of these candidates lost the mark for part (b) because they rounded their answer to part (a) before writing it in standard form. As a consequence, many incorrect answers of the form
6.714×10^2 were seen. Part (c) was a follow through mark (B1) from the candidate's answer to part (a). It did, however, require at least five figures in the answer to part (a) for a mark to be given in this part. The profile of marks for this question tended to be B1, B0, B1.

Question 12

Not well tackled at all by weaker candidates who seemed unable to use the coordinates effectively to find the sides of a right angled triangle. It was, however, a popular question with much correct working seen amongst average and able candidates. Many of these candidates were able to identify the lengths of the two sides at right angles to each other (B1) and the correct formula was used (M1) to determine the required area of 3 (A1). Interestingly, a significant number of candidates used the vector cross-product method. Whilst this is a topic well beyond this syllabus, it is a perfectly acceptable alternative method and was marked accordingly.

Question 13

The question asked candidates to give reasons but this seems to have been ignored by a significant number of candidates. As a consequence, a maximum of one mark only was available to these candidates. An assumption that $\Delta\, ABC$ is equilateral proved to be the downfall of some candidates and again, a maximum of one mark was available for such candidates. For the first mark, candidates needed to state the value of another angle in the figure with a reason. Angles such as $\angle\, ACE = 55°$ (base angles of an isosceles triangle), $\angle\, DBC = 55°$ (base angles of an isosceles triangle) and $\angle$ ABC = 55° (alternate segment theorem) (B1) proved to be popular correct first steps. It must be emphasised, however, that the angle on its own was not sufficient for the mark as a valid reason was also required. The second mark was for correctly identifying an angle which would lead directly to the final answer (again with a reason) (B1). Typically, $\angle\, AEC = 70°$ (angle sum of triangle) or $\angle\, FBA = 60°$ (base angles of an isosceles triangle) were common correct steps seen. $\angle\, DFE = 60°$, with no incorrect working seen and no requirement for a reason, earned the final mark (B1).

Question 14

Even weaker candidates were able to perform well on this question as the majority of candidates wrote down the two correct equations derived from the vector equation (M1)

and many correct vectors of the form (B1, $\begin{pmatrix} 1 \\ -3 \end{pmatrix}$ B1) were seen.

Question 15

Simultaneous equations are invariably tackled well and this question proved no exception with many correct answers seen. Indeed, method was correct on the majority of scripts with only a few candidates losing the accuracy marks because of arithmetical slips. The popular method of solution again proved to be balancing the equations (M1) followed by the elimination of one of the two variables (M1 dep). Answers of $x = 5$ (A1) and $y = -3$ (A1) were seen in abundance.

Question 16

As indicated in the general points above, candidates at all levels of ability found this question, involving a solid, difficult. Seemingly the curved surface area of a cone, πrl, is not one of the memorable formulae that candidates can recall and only a minority of candidates used $\sqrt{(10^2 + 5^2)}$ (M1) to arrive at a slant height of 11.2 cm. Despite few candidates obtaining this first mark, the second mark was for either π x 5 x c's(11.2) or for π x 5^2 (M1). This tended to be the only mark that many candidates achieved for this question. The final method mark was for combining the curved surface area with the base area (M1 dep) to arrive at the answer of 254 cm^2 (A1).

Question 17

A question reasonably well attempted by candidates of all abilities. Many are well drilled in the technique of handling algebraic expressions involving two inequalities and many correct inequalities of the form $-4 < 3x$ (M1) and $3x \le 3$ (M1) were seen. Some candidates were confused with the '-' sign involved in the first of these inequality expressions and this sometimes led to the sign being the wrong way round. Such candidates lost method and, of course, accuracy. Despite this, many correct answers of the form $x > -4/3$ (A1) and $x \le 1$ (A1) were seen.

Question 18

Surprisingly, not many candidates showed good method in this question. Many could not handle the concept of a 'reverse' percentage and a significant number of candidates failed to achieve full marks because answers were not given to two decimal places. A common incorrect method and answer for part (a) was £ 122 (£100 + 22% of £ 100). Able candidates, however, were able to recognise that they needed to divide £ 100 by 78% (M1) to arrive at an answer of £ 128.21 (A1). In part (b), weaker candidates simply wrote down 60% of £ 100 = £ 60 and thus earned no marks. However, evaluating 60% of their answer to part (a) was sufficient for method (M1) and an answer of either £ 76.93 or £ 76.92 (A1) was sufficient for the accuracy mark. This question and the next proved to be the most difficult on the paper for the weaker candidates.

Question 19

Many candidates, of all abilities, had difficulty relating a trigonometrical equation to a right angled triangle and therefore scored little or nothing on this question. Those candidate who did use a right angled triangle invariable found the third side as $\sqrt{2}$ (M1) which led most to the required answer of $\sqrt{2}/\sqrt{3}$ (A1) in part (a). Invariably, candidates who worked out the third side of a right angled triangle in part (a), achieved method in part (b). Indeed, a significant number of candidates used 4 rather than $\sqrt{2}$ in part (a) and, whilst they lost both marks in this part of the question, they were able to pick up the two method marks in the second part of the question. The first method mark (M1) in part (b) was for writing down a correct statement for $\frac{\tan\theta}{\sin\theta}$ with the candidate's three sides of their right angled triangle correctly substituted where required. The second mark (M1 dep) was for correctly handling the division and statements such as $\frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{\sqrt{2}}$ earned this mark. Candidates who knew how to tackle this question and made no arithmetical slips invariably arrived at the required answer of $\frac{\sqrt{3}}{2}$ (A1). Such correct answers though were few and far between.

Question 20

In part (a), many candidates recognised that they needed to evaluate $(x - 5).x - (-2).2$, but the method mark (M1) was not achieved until the last term was correctly evaluated as + 4. Whilst many correct expressions of $x^2 - 5x + 4$ were seen (A1), an embedded expression such as $\frac{1}{x^2 - 5x + 4}$ failed to earn this accuracy mark. Many correct answers were seen in part (b) where a correct quadratic expression was obtained in part (a). A correct factorisation (M1) invariably led candidates to the required answers of 4 (A1) and 1 (A1).

Question 21

Many candidates were able to achieve full marks to parts (a) and (b) of this question but the understanding of the statement '*the angle that the vector $\overrightarrow{OA}$ makes with the positive direction of the x-axis*', proved difficult to understand by the majority of candidates and many blank spaces were in evidence on scripts for part (c) of this question. For the weaker candidates, correctly identifying and labelling the point A (B1) proved to be a good start to the question. Part (b) required some Pythagoras and again, many candidates of all abilities, showed good method (M1) to arrive at the required answer of 7.21 (A1). In part (c), with many candidates incorrectly identifying the complementary angle or simply not tackling the question part at all, few correct statements of the form $\tan \theta = 4/6$ (M1) were seen. Consequently, the answer 33.7° (A1) proved to be quite elusive.

Question 22

Although not the hardest of questions on this paper, many candidates still created problems for themselves by poor algebraic manipulation. In part (a), many were able to give a correct statement for the area of the required triangle (M1) but poor algebra, particularly in handling brackets, meant that fewer than expected arrived at the answer of $x^2 + 7x$ (A1). In part (b), some candidates were able to recover and give a fully correct answer despite poor working in part (a) as many candidates equated 240 to a correctly stated formula for the area of a rhombus (M1) and rearranged to arrive at
$4x^2 + 28x - 240 = 0$ (or equivalent) (A1). Candidates are well drilled in solving quadratic equations (M1) and many correct answers of 5 (A1) were seen.

Question 23

Much wrong working, by candidates of all abilities, was seen throughout this question. In part (a), 3.5 and 4 were common incorrect answers. The former value arrived at (incorrectly) by simply adding 3 and 4 and dividing by 2 – the middle score value. The required answer of 3 (B1) was not seen on as many scripts as expected. Part (b) proved to be a popular question and many correct answers of 10/40 (B1) were seen. The remainder of the question however proved to be to difficult for all but the most able. Many simply reverted to a fair die and answers of 1/36 and 1/18 proved to be two very popular, but incorrect, answers. Others simply used the numbers given and produced answers of the form 2/40 x 6/40 for part (c) and 2/40 x 6/40 + 6/40 x 2/40 for part (d). Of those candidates who recognised that they needed to use the frequencies from the given table, most were able to produce the answers of 8/40 x 3/40 (M1) = 3/200 (A1) for part (c) and double this answer for part (d) (M1, A1).

Question 24

Candidates who recognised that differentiation was required scored well on this question. However, there were a significant number of candidates who simply substituted $t = 4$ into part (a) to arrive at an incorrect answer of 120 m/s. Dividing this value by $t = 4$ to arrive at an incorrect answer of 30 m in part (b) proved to be quite a popular, but erroneous, answer. In part (a), differentiating to arrive at $50 – 10t$ (M1) and then substituting $t = 4$ (M1 dep) invariably led those candidates using a correct method to the required answer of 10 m/s (A1). In part (b), candidates who recognised that at the highest point the velocity is zero and therefore equated their answer to part (a) to zero (M1) to identify a value of $t = 5$, invariably substituted correctly back into the displacement function (M1 dep) to arrive at the required answer of 125 m. A minority of candidates used a trial and error method in this part of the question which, if the correct answer was identified, earned full marks. It should be emphasised though that such methods are ‘all or nothing’ methods and candidates should be encouraged to use more formal methods in solving this type of question, particularly if the required answer is not a neat integer value.

Question 25

Whilst some candidates did not attempt this question suggesting that they had not covered this topic, the question proved to be quite popular with many candidates correctly placing the missing integers into the correct segments on the diagram (B3) and only the occasional slip seen. On some scripts, candidates simply filled each of the four given sets with the numbers given and many duplicates appeared in different segments on the diagram. Such candidates lost all three of the marks for this part of the question. Curiously, for many candidates, the remainder of the question was tackled independently of part (a) with a significant number of candidates getting no marks for part (a) but full marks for the remainder of the question and another significant group of candidates who achieved full marks for part (a) but nothing for the remainder of the question. Of the three required answers, the answer of 8 (B1) for part (b) proved to be more popular than the answers to parts (c) 6, 7, 8, 9 (B1 ft) and (d) 1, 9 (B1). Brackets were ignored and therefore not penalised despite the fact that the question asked for the elements of the sets and not the sets themselves.

Question 26

Much wrong working was seen in this question as many candidates struggled to identify what was required. Whatever way part (a) was tackled, the radius, $\frac{32}{2\pi}$ (M1), was an essential component. From this value, successful candidates went one of two ways. Either they worked out the volume of the cylinder (M1) and then determined $\frac{7}{32}$ x this volume (M1 dep) to arrive at the required answer of 178 cm^3 (A1) or they determined the angle (78.8°) (M1) of the slice removed and then used $\frac{\text{c's}(78.8)}{360}$ x π x c’s(radius) x 10 (M1 dep) to arrive at the required answer (A1). In part (b), a significant number of candidates recovered from a very poor part (a) by dividing their answer to part (a) by the volume of the cylinder and multiplying by 100 (M1). Of course, only a correct answer to part (a) led candidates to the required answer of 21.8% (A1) Dependent on candidate’s working, an alternative answer of 21.9% was also acceptable.

Question 27

Some weaker candidates seemed confused with what is meant by an ‘*angle of depression*’ and an incorrect answer of 10.3 m in part (a) was not uncommon. Despite this, many candidates were able to identify correctly the length of *BC* as 8.7 m (M1) in length. Those candidates who knew what was meant by the angle of depression invariably wrote down a correct trigonometrical expression (M1) to arrive at the required answer of 7.27 m (A1). In part (b), many candidates were able to give a correct length for *AB* (M1) but, rather curiously, of those candidates who incorrectly interpreted the angle of depression in part (a), many recovered in part (b) to give a correct trigonometrical statement for $\angle$ *DAB* (M1 dep). The final answer of 55° (A1) proved to be quite elusive as a consequence of either incorrect previous working or failing to give the final answer to the required degree of accuracy.

Paper 2

Introduction

There was no general indication that the examination paper was too long, with most candidates attempting nearly all of the questions. Overall, the standard of presentation and clarity of work was high. Some candidates chose to present some of their work in the form of second columns and, as pointed out in previous reports, unfortunately in many such cases, the clarity of the attempts was spoiled by crossings out and cramped work making the work difficult to read and follow. Some candidates did not use the graph paper in the examination paper booklet and instead choose to use loose graph paper leaving the page with graph paper in the booklet blank. This practice should be avoided in future.

There was no indication that the candidates were adversely influenced by the new layout of the paper presumably because of the similar layout that is and has been used for Paper 1.

Once again, it was pleasing to observe that many of the candidates have a good understanding of the basic techniques of arithmetic, algebra and trigonometry and were able to apply them correctly. The major discriminating questions were Q8(b), Q11(d), Q12(d) and Q12(e), whilst minor discriminating questions were Q5, Q6, Q9(c) and Q10(f). These will be discussed fully below. It was, however, very pleasing to observe from the candidates' answer to Q7(c), that many are now starting to understand the concept of the domain of a function.

Report on Individual Questions

Question 1

Many correct attempts were seen at this question. Part (a) was usually fully correct. The favoured method used by candidates for part (b) was $\frac{2052}{"114"} \times 360$ which was normally correctly evaluated to 6480. However, some candidates chose to divide by 360 which resulted in them gaining no marks.

Question 2

Part (a) presented no problem to nearly all of the candidates. Most candidates in part (b) were able to calculate that there were 10 000 nails in the red box but some then were not able to correctly find the number of nails in the yellow box, thus usually scoring just one mark for part (b). A number of candidates correctly found the number of nails in each box but then failed to write down a ratio as required by the question, thus gaining the two method marks but failing to gain the accuracy mark.

Question 3

It was interesting to note that many candidates did not write down the resultant product matrix, namely, $\begin{pmatrix} 2x^2 & 2xy \\ 2xy & 2y^2 \end{pmatrix}$, and chose to immediately go to the next step and write down the equations obtained by equating the elements of the two matrices and then correctly evaluate x, y and w . Common errors that were seen were " $x^2 + x^2$" in the product matrix and then x^4 or $2x^4$ in the equations equating the elements of the matrices, ditto for "y^2 + y^2". Such candidates were usually able to pick up the two B marks but lost the M marks.

Question 4

Part (a) was normally correctly attempted but a common error was the substitution of -2 for x rather than 2 arriving at an answer of 7 for a, losing both marks for part (a) and then usually all of the marks for part (b) because of the structure of their resultant cubic. There were many fully correct attempts at part (b) with such candidates correctly deriving $x^2 + 7x + 12$ and then factorising this. Unfortunately, a number of candidates prematurely ended their answer at this stage and failed to collect the final mark for writing down the factorised form of the cubic as required by the question. Some candidates who did not go down the route of dividing x - 2 into their resultant cubic instead rewrote $x^3 + 5x^2 - 2x - 24$ as $x(x^2 + 5x) - 2(x + 2)$ and then proceeded to try incorrectly factorise this version of the cubic usually losing all of the marks for part (b).

Question 5

As mentioned above, this was one of the discriminating questions of the paper but which did, nonetheless, receive many fully correct attempts. The usual error was the failure to correctly convert or attempt to convert a length (e.g. m to cm) or volume (cm^3 to m^3) scale normally causing the loss of the first method mark and of the accuracy mark. Another error, usually compounding the conversion error, was the failure to find the volume filled in one unit of time which usually resulted in the loss of all the marks bar possibly the method mark for the conversion of seconds to minutes.

Question 6

Another discriminating question in which many candidates were not able to use the information given to correctly arrive at algebraic expressions for n($A \cup B \cup C$) and/ or n($A \cap B$) + n($B \cap C$) + n($A \cap C$) with some candidates having negative terms in their expressions. Centres would thus be advised to spend time on concentrating on the use and interpretation of such set terminology. The third and fourth method marks were awarded for the candidate solving their two consistent simultaneous linear equations in both x and y even if they were incorrectly obtained.

Question 7

Most candidates collected the mark for part (a) with many also collecting both marks for part (b). A common error seen for part (b) was the inability to simplify $5\left(\frac{x+1}{2x}\right) - 2$ into the answer thus collecting only the method mark. A worse algebraic error that was seen often was $5\left(\frac{x+1}{2x}\right)$ being equated to $\frac{10x+5}{10x}$ or $\frac{5x+5}{10x}$. As mentioned above, it was very pleasing to see many correct answers to part (c). Many candidates picked up a mark for equating their, possibly incorrect, answer to part (b) to $2x$ and some then obtained a trinomial quadratic equation which then offered them the opportunity to collect a method mark for correctly trying to solve this equation. However, there were many correct attempts at this part.

Question 8

Many candidates had trouble with completing the tree diagram and thus usually did not collect any marks for parts (b) and (c). A number of these candidates had probabilities of magnitude greater than one in their diagrams. Of those that did produce a correct tree diagram, many went on to answer part (c) correctly but answer part (b) incorrectly. Often seen in part (b) was the erroneous method that the Most candidates collected the mark for part (a) with many also collecting both marks for part (b). A common error seen for part (b) was the inability to simplify $5\left(\frac{x+1}{2x}\right)-2$ into the answer thus collecting only the method mark. A worse algebraic error that was seen often was $5\left(\frac{x+1}{2x}\right)$ being equated to $\frac{10x+5}{10x}$ or $\frac{5x+5}{10x}$. As mentioned above, it was very pleasing to see many correct answers to part (c). Many candidates picked up a mark for equating their, possibly incorrect, answer to part (b) to $2x$ and some then obtained a trinomial quadratic equation which then offered them the opportunity to collect a method mark for correctly trying to solve this equation. However, there were many correct attempts at this part.

probability of hitting the target at least once was P(HMM) + P(MHM) which omitted the other three possibilities and usually resulted in an answer of 0.168 and scored no marks. Part (b) was thus a major discriminator. Indeed, there were a number of candidates who did not attempt this question at all. Again, it appears that questions on probabilities are proving to be difficult to many candidates, although pleasingly, there was a considerable number of candidates who did answer this question correctly.

Question 9

Usually parts (a) (b) were correctly answered by many candidates who then went on, in part (c), to equate their answers but then failed to correctly identify and set to zero the coefficients of vectors **a** and **b**, losing all of the marks for this part. Common errors seen in parts (a) and (b), were $PD = \frac{1}{2}\lambda\mathbf{b}$ leading to AD = **a** + $\frac{1}{2}\lambda\mathbf{b}$, scoring B0 M1 A0 and $PC = \frac{1}{2}\mu\mathbf{a}$ leading to BC = **b** + $\frac{1}{2}\mu\mathbf{a}$, again scoring B0 M1 A0. Equating these forms of AD and BC leads to $\lambda = \mu = 2$, which would have collected both method marks but not the two accuracy marks. Most candidates, even those who made no attempt at the rest of question, collected the mark for part (d) presumably because of the shape of the diagram given in the question.

Question 10

It is pleasing to note that many candidates obtained full marks for parts (a), (b), (c), (d) and (e). However, a common error made by a number of candidates in part (d) was to calculate $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 2 & 1 & 0 \\ 2 & 1 & 1 \end{pmatrix}$ instead of $\mathbf{M}\begin{pmatrix} 2 & 1 & 0 \\ 2 & 1 & 1 \end{pmatrix}$ and then the product of $\mathbf{N}$ and $\mathbf{M}\begin{pmatrix} 2 & 1 & 0 \\ 2 & 1 & 1 \end{pmatrix}$. A follow through mark was awarded for the diagram in part (e) so such candidates could at least collect the mark for part (e). Part (f), though, was not well attempted. Most candidates who, although they realized that a 90^{o} rotation and that an enlargement of scale factor 3 was involved, failed to explicitly state that both transformations were about the origin, usually losing two of the four marks available for this part. Those candidates who incorrectly answered part (d), usually failed to collect any marks for part (f).

Question 11

It was pleasing to observe that parts (a), (b) and (c) presented no trouble to most candidates, however, part(d) did. A common error was to set $\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta ABD} = \frac{BC^2}{BD^2}$ leading to an answer of 2.25 for *CD*. Alas such attempts collected no marks. However, many such candidates then went on to use their incorrect value for *BC* (12.25) to obtain the radius of circle and then calculate its area (usually 137). These collected two of the three marks available. On the whole, it was very pleasing to see many completely correct attempts at this question.

Question 12

Most candidates made reasonable attempts at parts (a), (b) and (c) and usually collected most of the marks. However, a common error seen in part (c) was that candidates gave the maximum y value and the minimum y value rather than the corresponding x values as required by the question. There were many candidates failed to give the sets of values as required in part (d) and gave instead just the values of the end points with no further explanation, losing both marks. We would suggest that it would be to the benefit of such candidates if Centres explained in more detail the meaning of the demand of such questions. In part (e), many candidates failed to score anything because they did not realize that they were required to draw the line $y = -x$. Some of these candidates drew the wrong line but most failed to draw any line at all.

PURE MATHEMATICS B 7361, GRADE BOUNDARIES

Grade	A	B	C	D	E
Lowest mark for award of grade	**81**	**65**	**49**	**44**	**33**

Note: Grade boundaries may vary from year to year and from subject to subject, depending on the demands of the question paper.

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