edexcel

Principal Examiner Feedback

November 2011

GCSE Mathematics (5384H)
Paper 13H (Non-Calculator)

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

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

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

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

Ask The Expert can be accessed online at the following link:
http://www.edexcel.com/Aboutus/contact-us/

November 2011
Publications Code UG029745

1. PRINCIPAL EXAMINER'S REPORT – HIGHER PAPER 13

1.1. GENERAL COMMENTS

1.1.1. There was a general weakness in attempts at questions towards the end of the paper. Only a minority of candidates showed any real understanding of these topics.

1.1.2. It was pleasing that many candidates showed sufficient working out to gain method marks when the final answer was incorrect.

1.1.3. Candidates should be encouraged to check the reasonableness of their answers. In Q1(c), for example, many candidates gave an answer of £6.50. If Theo spent £6.50 on bus fares and £3.50 on food then he did not spend £1.50 more on bus fares than on food. In Q3, answers of 210° were very common even though it is clear from the diagram that angle *a* is less than 180°. Many candidates marked the interior angle of the hexagon as 60° on the diagram when it is clearly obtuse.

1.1.4. Candidates using a decomposition method to work out percentages are advised to show all their working, e.g. 10% = 18, so 5% = 18 ÷ 2 = 9, so 2½% = 9 ÷ 2 = 4.5.

1.2. REPORT ON INDIVIDUAL QUESTIONS

1.2.1. Question 1

The majority of candidates answered part (a) correctly. Incorrect answers were often the result of failing to give the fraction in its simplest form. Some candidates expressed 16, rather than 4, as a percentage of 20.

Part (b) was also answered well with many candidates working out the correct percentage. A variety of methods were used. Some candidates used $\frac{6}{20}\times100$, some worked with equivalent fractions and some started with 10% = 2. Two common errors were to use $\frac{20}{6}\times100$ and to work out 6% of 20. Some candidates gave the answer as $\frac{3}{10}$.

Part (c) was answered less well. The most common approach was for candidates to add £1.50 to £5 and to subtract £1.50 from £5 resulting in £6.50 being a very common incorrect answer. Correct answers were often the result of subtracting £1.50 from £10 and dividing by 2 to find the money spent on food. Many candidates used a trial and error approach.

1.2.2. Question 2

Part (a) was not answered as well as might have been expected. A surprising number of those candidates who attempted to use 'speed = distance ÷ time' failed to use either 30 minutes or 0.5 as the time. Candidates who started with 2.5 ÷ 30 usually failed to arrive at the correct answer and working out 2.5 ÷ 0.5 also caused problems. The distance to the library, 2.5, was often given as the final answer.

Candidates were more successful in part (b) with the majority able to complete the distance-time graph correctly. Almost all candidates drew a horizontal line for the time spent in the library followed by a line to the horizontal axis. Errors were usually the result of candidates failing to use the scale on the horizontal axis correctly.

1.2.3. Question 3

Overall, this question was not answered well and many candidates were unsure of how to find interior and exterior angles. A common misconception was for candidates to work out 360 ÷ 6 but then assume that this gave the size of an interior angle. They then went on to subtract the sum of this angle and 90 away from 360 to give an answer of 210 degrees. Many candidates annotated the diagram in order to help them do the question, placing 60 as the interior angle even though the angle is clearly obtuse. Too many candidates could not divide 360 by 6 correctly.

1.2.4. Question 4

This question was generally answered well with many candidates able to add the two fractions correctly. Not surprisingly the most common incorrect answer was $\frac{3}{10}$, the result of candidates adding the numerators and adding the denominators. Some candidates recognised the need to use a common denominator but failed to deal with the numerators and gave an answer of $\frac{3}{21}$.

1.2.5. Question 5

In part (a) the vast majority of candidates were able to translate the shape but many failed to draw it in the correct position. Translating the shape 8 squares to the left and 2 squares down was very common, due to candidates failing to take into account the scale on each axis. Some candidates could not cope with the vector and drew the shape with one vertex at (8, –2).

Part (b) was answered less well. Most candidates did reflect the shape but most commonly this was a reflection in the y-axis or in the x-axis rather than in the line $y = x$. Some candidates reflected the shape in the line $y = -x$.

1.2.6. Question 6

Many candidates gained at least 2 marks on this question. The majority found 22.5% (or 122.5%) of 180 and 17.5% (or 117.5%) of 180 and then worked out the difference. Marks lost tended to be due to errors when breaking 180 down to find 10%, 5% and 2.5%. Only a few candidates realised that as the difference between the two increases is 5% they simply needed to find 5% of 180.

1.2.7. Question 7

Part (a) was well attempted with many candidates giving an answer of 6 and gaining full marks. It was pleasing to see many candidates presenting their working out in a logical manner, showing a good understanding of the processes involved. Most candidates were able to expand the bracket correctly. Those who did not tended to forget to multiply –4 by 3 or made careless errors such as $3\times2t = 5t$. Some candidates struggled to isolate the terms in t or the constant terms, adding instead of subtracting and vice versa. Some candidates used trial and improvement.

Part (b) was also answered quite well. A common error was for candidates to factorise $x^2 + 2x - 15$ correctly but then give the factorisation as the final answer and not go on to give the values of x. Some candidates lost marks by using the wrong signs when factorising. Very few candidates attempted to solve the equation by using the formula or by completing the square. Those that did usually made mistakes.

1.2.8. Question 8

Fully correct answers were rare as candidates struggled with 'closer to the point *B* than to the point *D*'. Very few realised that they needed to draw in the perpendicular bisector of *BD*. A common response was to draw the diagonal from *A* to *C*. Many candidates gained one mark for drawing an arc, centre *C* and some went on to gain a second mark for shading the region inside the arc that was below their attempt at a perpendicular bisector. A number of candidates were clearly confused as to what the question required them to do, resulting in some varied responses.

1.2.9. Question 9

Many of the candidates who used the elimination method were successful. The large numbers in the question were generally handled well although some marks were lost through arithmetical errors, e.g. when multiplying 144 by 3 in order to eliminate x. Candidates who found one solution usually went on to correctly substitute their value for x or y into an equation. Some candidates stumbled on the 'signs' of the solutions. Conceptual errors involving adding the equations instead of subtracting were occasionally seen. Those candidates who used a trial and error approach rarely gained any marks.

1.2.10. Question 10

Part (a) was answered quite well with many candidates knowing that they needed to multiply 6 by 4 and to add the indices. Some, though, gave 24×10^{15} as the final answer. Candidates who first wrote 6×10^8 and 4×10^7 as normal numbers and then attempted to multiply were often unsuccessful.

Part (b) was not answered quite as well. A common error was for candidates to add 6 and 4 and to add the indices resulting in an answer of 10×10^{15}. Some candidates made mistakes when attempting to write 6×10^8 and 4×10^7 as normal numbers.

1.2.11. Question 11

Part (a) was not answered well and many candidates made no attempt at all to find the solutions. In both (i) and (ii) marks were often lost because candidates only gave one solution. Errors were also made in reading values from the graph.

In part (b) the majority of candidates did not appreciate that to solve the equations they needed to draw the line $y = x - 4$. Those that did were usually able to draw the line $y = x - 4$ correctly. Some went on to give fully correct solutions but some made errors in reading from the graph and some failed to give all the solutions.

1.2.12. Question 12

Part (a) was poorly answered with many candidates gaining no marks at all. It was common to see -5^2, rather than $(-5)^2$ or -5×-5, in the substitution and candidates often squared more than just -5. Many errors resulted from confusion about the correct order of operations. Candidates also struggled to deal with the negative numbers and squaring -5 often resulted in -25. Even candidates who got as far as $-10 - 150$ sometimes went on to give an incorrect answer.

Many candidates were unsure how to answer part (b), incorrectly rearranging to make x or x^2 the subject in one step. Those candidates who did gain marks had rearranged to isolate $2qx^2$ or $-2qx^2$ and then divided by $2q$ or by $-2q$. In the first step to isolate $2qx^2$ or $-2qx^2$ sign errors were very common. When square rooting both sides of the equation some candidates failed to square root both the numerator and the denominator of the fraction. The correct final answer was seen in many different forms.

1.2.13. Question 13

This question was not answered well. Candidates who knew that they needed to find the area of the triangle and the area of the sector often struggled to work out either correctly. Those who used $\frac{1}{2}ab\sin C$ were often able to find the area of the triangle. Many of the candidates who worked out the area of the circle correctly then went on to make errors when attempting to find the area of the sector. Some candidates, however, could not recall that the area of a circle is given by πr^2.

1.2.14. Question 14

This proved to be a very difficult question for candidates and fully correct solutions were very rare. Many candidates failed to appreciate that they first needed to find the height of the triangle. Candidates who did use Pythagoras' theorem to find the height of the triangle were usually unable to evaluate $(2\sqrt{3})^2$ correctly. When attempting to use Pythagoras some candidates added the squares instead of subtracting. Candidates who went on to find the area of the triangle sometimes worked out base × height and forgot to divide by 2.

GRADE BOUNDARIES

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

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

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com
Order Code UG029745 November 2011

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

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning