MATHEMATICS

General Certificate of Education (New)

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Advanced Subsidiary/Advanced

PURE MATHEMATICS A – AS UNIT 1

General comments

This paper seemed to be about the correct standard and length, though there were some feelings among students that it might have been a touch too long. As the marking was done question by question, very few entire scripts were seen, so it was difficult to judge whether this was actually the case. Very good solutions to all questions were seen with perhaps only question 12, and question 17, particularly part (c), causing general difficulties to all except the most able candidates.

Candidates should familiarise themselves with the formula booklet before sitting mathematics examinations. It would appear that some candidates did not know the formula required in question 11, for example, when they might have looked it up in the formula booklet.

Comments on individual questions

1. Both parts of this question were generally well done with some errors on tidying up the final answers losing candidates the last mark in each part.

2. Part (a) was well done by almost all candidates. In part (b), candidates did not always explain clearly their method, nor indeed say in their solution, which ratio was being considered. Often the ratio 2:1 or 1:2 appeared with no accompanying explanation. Disappointingly, in part (c), many candidates thought that the line crossed the x-axis when $x = 0$ rather than $y = 0$. This affected the number of available marks in part (d). In part (d), some candidates got the incorrect angle as the right angle making their solution completely wrong. This kind of error can be eliminated by a clearly drawn diagram and candidates should be encouraged to draw a clearly labelled diagram with questions on this topic.

3. Most candidates did not have difficulties with this question though a variety of strange and interesting substitutions for $\cos^2\theta$ were seen. Some candidates got the signs the wrong way round when factorising the quadratic. However, full follow through was given for the resulting angles.

4. As usual with questions on basic differentiation and integration, candidates scored high marks for this question. Errors were usually with the manipulation of the fractional indices.

5. Responses to this question were disappointing as candidates did not take sufficient care to preserve the asymptotes when sketching the graphs and so the asymptotes were not clearly indicated in the resulting diagram. The concept of an asymptote does not seem to be generally well understood by many candidates. Few candidates managed to gain all 4 marks available in this question.

6. Both parts of this question were reasonably well done. In part (b), some candidates had the incorrect limits in spite of getting everything correct in part (a). In addition, many errors were made with the final calculation. Candidates who ended up with a negative answer seemed perfectly happy with their solution.

7. Most candidates had the correct idea as to the trigonometric manipulation required but the standard of presentation of their proof leaves a great deal to be desired. Some candidates multiplied both sides by $\cos\theta$ and then worked on both sides of the equation at the same time. These candidates were happy when they arrived at the point when the two sides became the same. This lost them the final mark in the question which was only awarded when the quality of the mathematical presentation was good.

8. Both available methods were seen equally. This question did not cause any difficulties for most candidates.

9. When solving trigonometric equations, candidates nearly always give both the acute and the obtuse angle as their solution. Not so in this question. Candidates who got both answers required by the question were definitely in the minority. Some candidates did a lot of extra work finding all the lengths and angles of the triangle, which lost them examination time.

10. A generally well done question though lots of candidates had difficulties with simplifying powers of $\sqrt{b}$. In part (b), many candidates made the mistake of subtracting the two brackets instead of adding them.

11. Part (a) was such a simple question, but unfortunately many candidates did not think so. Most candidates were able to find the modulus of a vector but then, bafflingly, they did not know how to proceed. The formula required for part (b) can be found in the formula booklet. This fact would appear to have escaped the notice of many candidates. However, the candidates who found the formula often had the values 2 and 3 the wrong way round; whereas the candidates who did it from scratch using vector methods often got the correct answer.

12. Many candidates knew this question required the use of the discriminant of a quadratic equation. However, the presence of a term involving the unknown m threw them and their discriminant often had sign errors or bits missing. Also, the resulting quadratic inequality caused difficulties. Few completely correct solutions were seen.

13. Parts (a) and (b) of this question were well done generally. Some misunderstandings were apparent with candidates who mistakenly calculated $\frac{\mathrm{d}^2y}{\mathrm{d}x^2}$ to be zero claiming that the point under consideration to be a point of inflection. Many strange and incorrect statements were seen in part (c).

14. Part (a) was reasonably well done. However, in part (b), many candidates thought that showing that statement B is true for a particular pair of values for c and d was a sufficient proof that statement B is true for all values of c and d.

15. Most candidates were able to use the values given to obtain two equations for A and k. However, many did not know what to do with the resulting pair of equations and many did not know that $\mathrm{e}^0 = 1$.

16. Candidates who had an idea how to use the gradient function generally went on to gain full marks as the resulting calculations were simple. Candidates who used the discriminant method were mostly successful, but many made mistakes with the discriminant, particularly with the signs in the constant term.

17. This question proved to be the most difficult one on the paper for the candidates. This may be because it was the penultimate question on a long paper and candidates were under time pressure. Not many correct solutions were seen to all parts. In part (b), candidates tried to invert without first dividing by 2. In part (c), candidates were not able to write $4^x - 10 \times 2^x$ as $y^2 - 10y$; many candidates ended up with an incorrect linear expression in y which made the last 4 marks inaccessible.

18. Part (a) was well done by candidates using a variety of methods. In part (b), candidates who did not spot that *BC* is the diameter of the circle had some difficulties. This is another question where a carefully drawn diagram with points clearly labelled would have helped candidates towards a correct solution and to avoid mistakes.