

Instructions to Examiners

Note: Where there are two marks (e.g. M2, A2) for an answer do not split the marks unless otherwise instructed.

1 Method of marking

- (a) All marking must be done using a **red** pen.
- (b) Marks should be noted on candidates' scripts as in the markscheme:
 - ☒ show the breakdown of individual marks using the abbreviations (*M1*), (*A2*) etc., unless a part is completely correct;
 - ☒ write down each part mark total, indicated on the markscheme (for example, [*3 marks*]) – it is suggested that this be written at the end of each part, and underlined;
 - ☒ write down and circle the total for each question at the end of the question.

2 Abbreviations

The markscheme may make use of the following abbreviations:

(*M*) Marks awarded for **Method**

(*A*) Marks awarded for an **Answer** or for **Accuracy**

(*N*) Marks awarded for correct answers, if **no** working (or no relevant working) shown: they may not necessarily be all the marks for the question. Examiners should only award these marks for correct answers where there is no working.

(*R*) Marks awarded for clear **Reasoning**

(*AG*) **Answer Given** in the question and consequently marks are **not** awarded

Note: Unless otherwise stated, it is not possible to award (*M0*)(*A1*).

Follow through (ft) marks should be awarded where a correct method has been attempted but error(s) are made in subsequent working which is essentially correct.

- Penalize the error when it first occurs
- Accept the **incorrect** result as the appropriate **quantity** in all subsequent working
- If the question becomes much simpler then use discretion to award fewer marks

Examiners should use (**d**) to indicate where discretion has been used. It should only be used for decisions on follow through and alternative methods. It must be accompanied by a brief note to explain the decision made

3 Using the Markscheme

- (a) This markscheme presents a particular way in which each question may be worked and how it should be marked. **Alternative methods** have not always been included. Thus, if an answer is wrong then the working must be carefully **analysed** in order that marks are awarded for a different method in a manner which is consistent with the markscheme. Indicate the awarding of these marks by (**d**).

Where alternative methods for complete questions or parts of questions are included, they are indicated by **METHOD 1**, **METHOD 2**, *etc.* Other alternative part solutions are indicated by **EITHER...OR**. It should be noted that **G** marks have been removed, and GDC solutions will not be indicated using the **OR** notation as on previous markschemes.

Candidates are expected to show working on this paper, and examiners should not award full marks for just the correct answer. Where it is appropriate to award marks for correct answers with no working (or no relevant working), it will be shown on the markscheme using the *N* notation. All examiners will be expected to award marks accordingly in these situations.

- (b) Unless the question specifies otherwise, accept **equivalent** forms. For example: $\frac{\sin \theta}{\cos \theta}$ for $\tan \theta$.

On the markscheme, these equivalent numerical or algebraic forms will generally be written in brackets after the required answer. Paper setters will indicate the required answer, by allocating full marks at that point. Further working should be ignored, even if it is incorrect. For example: if candidates are asked to factorize a quadratic expression, and they do so correctly, they are awarded full marks. If they then continue and find the roots of the corresponding equation, do not penalize, even if those roots are incorrect, *i.e.* once the correct answer is seen, ignore further working.

- (c) As this is an international examination, all **alternative forms of notation** should be accepted. For example: 1.7, 1·7, 1,7; different forms of vector notation such as \vec{u} , \bar{u} , \underline{u} ; $\tan^{-1} x$ for $\arctan x$.

4 Accuracy of Answers

If the level of accuracy is specified in the question, a mark will be allocated for giving the answer to the required accuracy.

There are two types of accuracy error. Candidates should be penalized **once only IN THE PAPER** for an accuracy error (**AP**).

Award the marks as usual then write $-1(\mathbf{AP})$ against the answer and also on the **front cover**

Rounding errors: only applies to final answers not to intermediate steps.

Level of accuracy: when this is not specified in the question the general rule *unless otherwise stated in the question all numerical answers must be given exactly or to three significant figures* applies.

- If a final correct answer is incorrectly rounded, apply the **AP**
- OR**
- If the level of accuracy is not specified in the question, apply the **AP** for answers not given to 3 significant figures. (Please note that this has changed from 2003).

Note: **If there is no working shown**, and answers are given to the correct two significant figures, apply the **AP**. However, do **not** accept answers to one significant figure without working.

5 Graphic Display Calculators

Many candidates will be obtaining solutions directly from their calculators, often without showing any working. They have been advised that they must use mathematical notation, not calculator commands when explaining what they are doing. Incorrect answers without working will receive no marks. However, if there is written evidence of using a graphic display calculator correctly, method marks may be awarded. Where possible, examples will be provided to guide examiners in awarding these method marks.

Examples

1. Accuracy

A question leads to the answer 4.6789....

- 4.68 is the correct 3 s.f. answer.
- 4.7, 4.679 are to the wrong level of accuracy : both should be penalised the first time this type of error occurs.
- 4.67 is incorrectly rounded – penalise on the first occurrence.

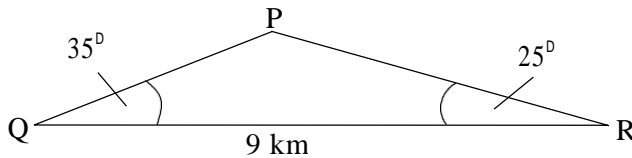
Note: All these “incorrect” answers may be assumed to come from 4.6789..., even if that value is not seen, but previous correct working is shown. However, 4.60 is wrong, as is 4.5, 4.8, and these should be penalized as being incorrect answers, not as examples of accuracy errors.

2. Alternative solutions

The points P, Q, R are three markers on level ground, joined by straight paths PQ, QR, PR as shown in the diagram. $QR = 9 \text{ km}$, $\hat{Q} = 35^\circ$, $\hat{R} = 25^\circ$.

(Note: in the original question, the first part was to find $PR = 5.96$)

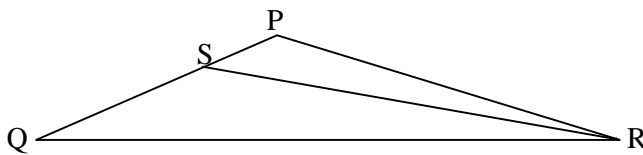
diagram not to scale



- (a) Tom sets out to walk from Q to P at a steady speed of 8 km h^{-1} . At the same time, Alan sets out to jog from R to P at a steady speed of $a \text{ km h}^{-1}$. They reach P at the same time. Calculate the value of a .

[7 marks]

- (b) The point S is on [PQ], such that $RS = 2QS$, as shown in the diagram.



Find the length QS.

[6 marks]

MARKSCHEME

(a) **EITHER**

Sine rule to find PQ

$$PQ = \frac{9 \sin 25}{\sin 120} \quad (M1)(A1)$$

$$PQ = 4.39 \text{ km} \quad (A1)$$

OR

$$\text{Cosine rule: } PQ^2 = 5.96^2 + 9^2 - (2)(5.96)(9) \cos 25 \quad (M1)(A1)$$

$$= 19.29$$

$$PQ = 4.39 \text{ km} \quad (A1)$$

THEN

$$\text{Time for Tom} = \frac{4.39}{8} \quad (A1)$$

$$\text{Time for Alan} = \frac{5.96}{a} \quad (A1)$$

$$\text{Then } \frac{4.39}{8} = \frac{5.96}{a} \quad (M1)$$

$$a = 10.9 \quad (A1) \quad (N5)$$

[7 marks]

Note that the **THEN** part follows both **EITHER** and **OR** solutions, and this is shown by the alignment.

(b) **METHOD 1**

$$RS^2 = 4QS^2 \quad (A1)$$

$$4QS^2 = QS^2 + 81 - 18 \times QS \times \cos 35 \quad (M1)(A1)$$

$$3QS^2 + 14.74QS - 81 = 0 \text{ (or } 3x^2 + 14.74x - 81 = 0) \quad (A1)$$

$$\Rightarrow QS = -8.20 \text{ or } QS = 3.29 \quad (A1)$$

$$\text{therefore } QS = 3.29 \quad (A1)$$

METHOD 2

$$\frac{QS}{\sin \hat{SR}Q} = \frac{2QS}{\sin 35} \quad (M1)$$

$$\Rightarrow \sin \hat{SR}Q = \frac{1}{2} \sin 35 \quad (A1)$$

$$\hat{SR}Q = 16.7^\circ \quad (A1)$$

$$\text{Therefore, } Q\hat{S}R = 180 - (35 + 16.7) = 128.3^\circ \quad (A1)$$

$$\frac{9}{\sin 128.3} = \frac{QS}{\sin 16.7} \left(= \frac{SR}{\sin 35} \right) \quad (M1)$$

$$QS = \frac{9 \sin 16.7}{\sin 128.3} \left(= \frac{9 \sin 35}{2 \sin 128.3} \right) = 3.29 \quad (A1) \quad (N2)$$

If candidates have shown no working, award (N5) for the correct answer 10.9 in part (a), and (N2) for the correct answer 3.29 in part (b).

[6 marks]

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/577015115046006053>