ANALYTICAL GEOMETRY

1. QUESTION 1

   When both co-ordinates of a point are requested, remember to get the point of intersection of the two lines.

2. QUESTION 2

2.1 The GRADIENT OF A LINE is equal to the TAN of the POSITIVE ANGLE between the LINE and the POSITIVE X-axis.

2.2 Rounding off must, as far as possible, always be carried out in the last step.
Learners should be encouraged not to use a calculator more than once during a calculation.
Rather write the unknown as the subject of the formula and use the calculator once.

2.3 To find a locus in these questions, learners must use analytical methods in combination with geometrical concepts, rather than thinking algebraically.

TRIGONOMETRY

1. Compound angle proofs were good. Teachers must emphasize the proofs of trigonometric theorems.

2. When using the reduction formula, the ultimate sign of the ratio must be indicated clearly before any further calculations are carried out.
   Do not immediately change the "-" signs to "+" during multiplication in the first calculation after substitution, e.g. $\tan 120^0 . \cos 210^0 = (-\tan 60^0)(-\cos 30^0) = \tan 60^0 . \cos 30^0$

3. The signs of compound trig. ratios when squaring need emphasizing, e.g.
   $\text{cosec}^2(180^0 + \theta) = [\text{cosec}(180 + \theta)]^2 = [-\text{cosec}\,\theta]^2 = \text{cosec}^2\,\theta$

4. Solving trigonometric equations needs more attention.

5. Learners are penalised for trigonometric graphs outside the specified domain.

6. When stating the domain for which a graph increases, the x – co-ordinate of a turning point is EXCLUDED, e.g. the graph of $\sin\theta$ increases for $0^0 \leq \theta < 90^0$ or $\theta \in [0^0; 90^0]$

7. The co-ordinates of turning points and points of intersection of graphs with the axes must always be indicated. It is good practice to also indicate the end points of any graph for a specific period not necessarily ending on the x-axis.

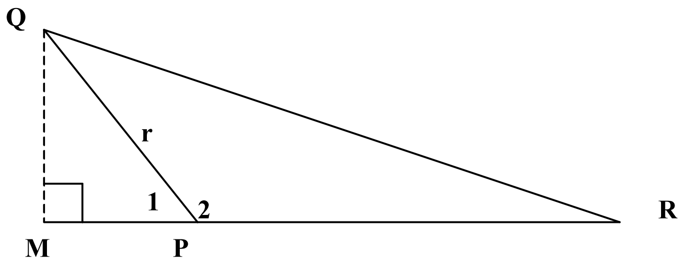
8. The importance of brackets in calculations must be emphasized, e.g.

$$\sqrt{10}\cos\left(x-30^0\right) \neq \sqrt{10}\cos x.\cos 30^0 + \sin x.\sin 30^0$$

BUT

$$\sqrt{10}\cos\left(x-30^0\right) = \sqrt{10}\,(\cos x.\cos 30^0 + \sin x.\sin 30^0)$$

9. When proving the cos formula for an obtuse-angled triangle , the two different angles (acute and obtuse) must be clearly indicated on the diagram and used in the proof.



SP = r cos P $_1$ = - r cos P $_2$

GEOMETRY

1. Geometry reasons must be SPECIFIC, clearly expressing the essence of the theorem, e.g. " radius $\perp$ chord bisects the chord " NOT " radius bisects chord".

2. Converse theorems must be emphasized. When proving a line to be a tangent, the reason should read " CONVERSE tan/chord theorem" and NOT " tan/chord theorem". When proving a cyclic quadrilateral, the reason should read :
   " CONVERSE ext. angle of cyclic quad" OR " ext. angle = interior opposite angle" NOT
   " ext. angle of cyclic quad = opposite interior angle".

3. UNITS must be used when working with ratios, e.g.
   RW:RQ = 3:4 means RW = 3x and RQ = 4x.

4. Orthocentre implies the interaction of THREE ALTITUDES. It is therefore important to state ALTITUDES and CONCURRENCY.

SUGGESTIONS FOR THE MATHEMATICS HG PAPER II IN GENERAL

1. Include the following in the instructions for learners:

   Start each question on a new page.
   Neat work will count in your favour.
   Work done in pencil will not be marked.
   Only the complicated geometry sketches should appear on the diagram sheet. The present diagram sheet is too cumbersome.