AN ROINN OIDEACHAIS

SAMPLE PAPER

INTERMEDIATE CERTIFICATE EXAMINATION, 1990
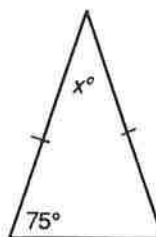
MATHEMATICS — SYLLABUS B — PAPER 2 (300 marks)

(TIME 2¹/₂ HOURS)
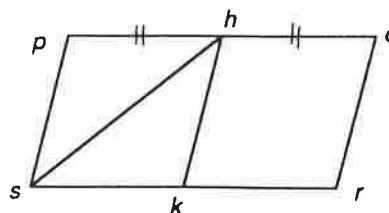
Attempt QUESTION 1 (100 marks) and FOUR other questions (50 marks each).

1. (i) Two angles of a triangle sum to 89° 59'.
   Calculate the measure of the third angle.

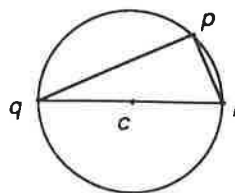   (ii) Express 0° 18' as a decimal of a degree.

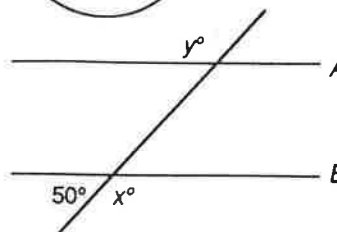   (iii) Calculate the value of x
   in the triangle shown.

   (iv) $pqrs$ is a parallelogram
   and $hk \parallel ps$.

   Find the image of Δhsk under
   the translation $\vec{ph}$.

   (v) In the circle, centre c,
   $|qr| = 0.5$m
   and $|pq| = 0.3$m.
   Calculate $|pr|$.


   (vi) Find the number of
   degrees in $x° + y°$
   where $A \parallel B$.


   (vii) Find the image of the point (3, 3) under the translation (6, 6) → (1, 1).

   (viii) Let (p, q) be the image of the point (1, 5) under the central symmetry in the origin.
   Find the image of (p, q) under the axial symmetry in the Y axis.

   (ix) If $\tan \theta = 2$, use the book of Tables to find the value of θ as accurately as possible.

   (x) If $\sin \theta = 0.5$, use the book of Tables to find the value of $\cos \theta$.

2. (a) A bar of soap costs 50p.
A "special offer" has two bars for 72p.
Find the saving per cent per bar in the "special offer".

(b) 10 circles are drawn, the diameter of each being 0·2cm less in length than the previous.
The diameter of the first circle is 3·96cm in length.
Calculate the area of the last circle.

3. *pqrs* is a parallelogram.
Name four pairs of equal angles.
Calculate | *rs* | if | $\angle psr$ | = 65°.
Find the area of the parallelogram
if [*pr*] bisects its area.

If | $\angle rps$ | = 25°, prove
that | $\angle pqr$ | = 65°.
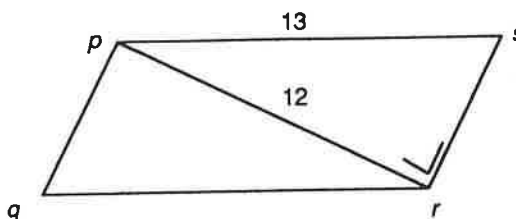
4. *pqr* are points of a circle, centre *c*.
If | $\angle pcr$ | = 58°,
show that | $\angle pqc$ | = 29°.
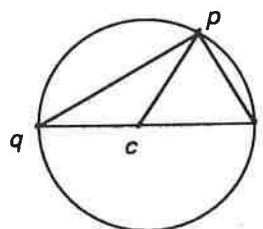
Construct: (i) $\triangle qtr$, the image of the triangle *qpr* under the centre symmetry in *c*.
Name the angle in the image triangle which is 61°.

(ii) $\triangle qsr$, the image of the triangle *qpr* under the axial symmetry in *qr*.

Prove that the triangles *qtr* and *qsr* are congruent.

5. $p(-2, 7)$ and $q(1, 3)$ are two points. Find | *pq* | and the slope of *pq*.
Let *f* be the axial symmetry in the *Y* axis. Find the coordinates of the images, $f(p)$ and $f(q)$.

Verify (i) that distance does not change
(ii) that slope does change
under the axial symmetry.

$$
\begin{array}{l}
\text{Distance formula:} \quad \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\
\\
\text{Slope formula:} \quad \dfrac{y_2 - y_1}{x_2 - x_1}
\end{array}
$$

6. (a) Two ships *P* and *Q* leave port at the same time. *P* sails due East at 10km/hour while *Q* sails in the direction North 30° East.
After one hour *Q* is directly North of *P*.
Calculate the speed of *Q* in km/hour.

(b) An upright pole of length 3·1m casts a shadow which is 5m long.
Find the angle of elevation of the sun.