MATHEMATICS - ORDINARY LEVEL - PAPER 2 (300 marks)

FRIDAY, 10th JUNE, MORNING - 9.30 to 12.00.

Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each).
Marks may be lost if all necessary work is not clearly shown.
Mathematics Tables may be obtained from the Superintendent .

1.   (i)   The area of the right-angled triangle abc
is 26 cm². If | bc | = 8 cm, calculate | ab |.
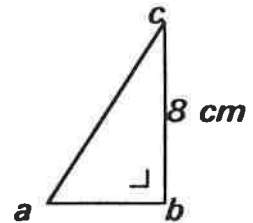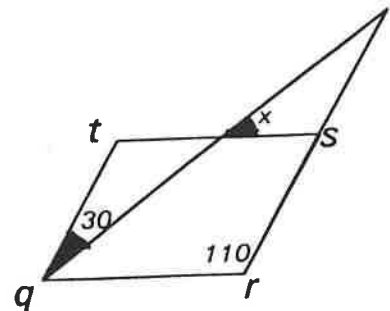
(ii) $prst$ is a parallelogram with its diagonals
intersecting at v.

Name the image of the triangle prt
under the central symmetry in v.
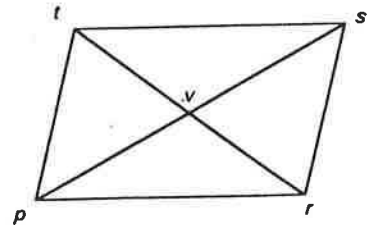
(iii) $qrst$ is a parallelogram with
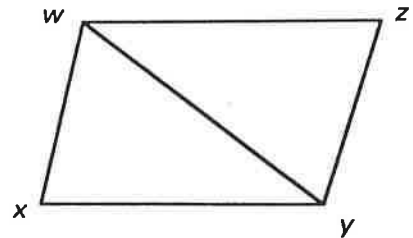angles of 30°, 110° and x°,
as shown, in the diagram.

Find the value of x.

(iv)   The side of a square is 5 cm long. Calculate the length of its diagonal.

(v)   Construct the triangle abc if | ab | = 7 cm, | $\angle cab$ | = 40° and | bc | = 6 cm.
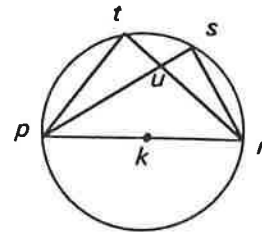
(vi) *wxyz* is a parallelogram

$| \angle wxy | = 80°$. $| wy | = | xy |$.

What is $| \angle wyz |$?

(vii) *k* is the centre of the circle.

$| \angle tps | = 30°$.

Calculate $| \angle sur |$.

(viii) Find the image of the point $(-2, 1)$ under the translation $(1, 4) \rightarrow (2, 1)$

(ix) $y + 2x = 3$ is the equation of the line. What is the slope of the line?
(The equation of a line with slope *m* is $y = mx + c$).

(x) Cos A $= 0.844$. Use the book of Tables to find the value of sin *A*.

2.

(a) A car was bought for IR£6000 and later sold at a profit of 15%.
Calculate the selling price.
Calculate the profit as a percentage of the selling price, to the nearest percent.

(b) A bicycle wheel has a diameter of 56 cm. Find the number of turns the wheel
must make in travelling 352 m without slipping. (Take $\pi = \frac{22}{7}$).

3.

*vwxy* and *xrst* are parallelograms. Their diagonals intersect at *z* and *m* respectively.

x is the mid-point of [*wt*] and of [*yr*].
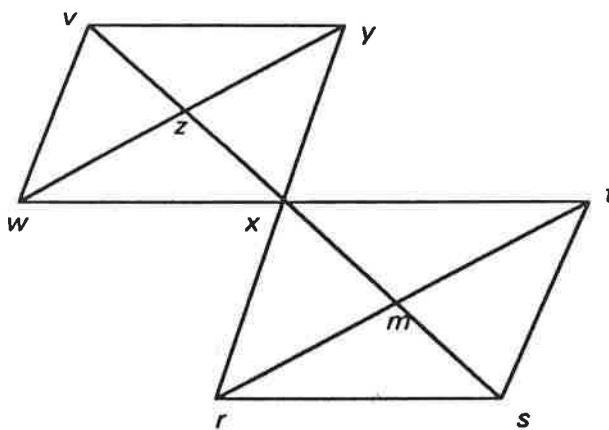
(i) Name two line segments each equal in length to | *vz* |.

(ii) What is the image of [*xs*] under the translation $\overrightarrow{rx}$.

(iii) Say why *wrty* is a parallelogram.

(iv) If |∠*trs* | = 25°, and | ∠*wyx* | = 42°, find |∠*wxy* |.

(v) Say why the triangle *wxy* is congruent to the triangle *rtx*.

4.

xz is a diameter of the circle, centre *k*. *wm* is perpendicular to [*kz*] through its mid-point, *m*.
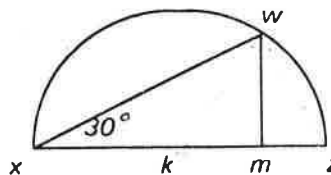
If |∠*wxk* | = 30°, write down
(i) |∠*zwx* | (ii) | ∠*xzw* | .

If the radius length is 5 cm, say why | *wz* | = 5 cm.

Show that | *wm* | = $\dfrac{\sqrt{75}}{2}$ cm and hence, or

otherwise, show that the area of the triangle *xkw* is $\dfrac{5}{4}$ $\sqrt{75}$ cm².

5. p is a point (2, 1) as in diagram.

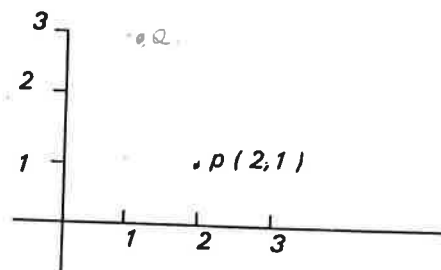Plot the point $q(1, 3)$.

Calculate $|\, pq \,|$.

[distance formula: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$].

Find the equation of pq.

[slope formula : $\dfrac{y_2 - y_1}{x_2 - x_1}$.   Equation of line: $y - y_1 = m\,(x - x_1)$].

By choosing a certain value for x in the equation or otherwise, calculate the coordinates of the point where the line pq cuts the y-axis.

6.   **(a)**   sin A = 0.5621. Use the book of Tables to find the value of A.

(b)   A ship sails East 31°44′ North from a port p at 12 kilometres an hour. After 2 hours and thirty minutes it reaches t, directly North of another port r.

Calculate $|\, rt \,|$ correct to the nearest metre.
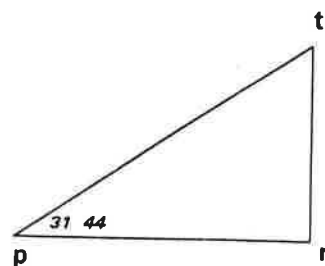
(c)   [xz] is a vertical cliff-face 86 metres high.
y is a point at sea 200 metres from the foot of the cliff.
Calculate $|\, \angle\, xyz \,|$ as accurately as the Tables allow.