

MATHEMATICS - ALTERNATIVE - ORDINARY LEVEL
PAPER 2 (300 marks)

FRIDAY, 12 JUNE - MORNING 9.30 - 12.00

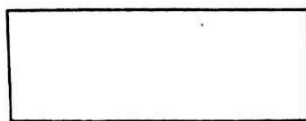
Attempt **SIX QUESTIONS** (50 marks each)

Marks may be lost if all your work is not clearly shown .

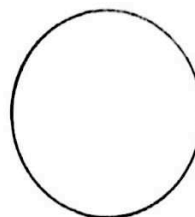


1. The diagrams show two house-signs in the shape of a rectangle and of a circle. Each sign is surrounded by a thin border and the area of each sign is 154 cm^2 .

Take $\pi = \frac{22}{7}$.

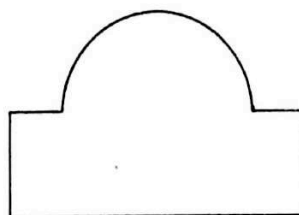


22 cm



- (i) Find the length of the border around the rectangular sign.
- (ii) Find the radius length of the circular sign.
- (iii) Find the length of the circular border.

A third sign combining half the circle and the rectangle is made as in the diagram.



22 cm

Calculate the length of the border around this sign.

2. A rectangular block of plastic has length 25 cm, width 12 cm and height 11 cm. Calculate its volume.

The block is melted down and reformed into 6 solid cylinders each of height 5.6 cm and of diameter 10 cm. The rest of the plastic is waste. Find the percentage of the block that is waste. (Take $\pi = \frac{22}{7}$).

OVER →

3. (a) A person is asked to choose at random an integer between 1 and 8 inclusive. What is the probability that the number chosen is either a 3 or a 4?

- (b) A batch of 100 eggs was classified according to size (1 or 2) and according to colour (brown or white). The results are given in the table.

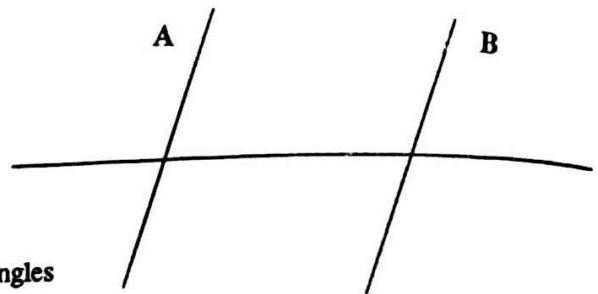
SIZE	BROWN	WHITE
1	40	20
2	24	16

An egg is chosen at random. What is the probability that it is

- (i) brown
 (ii) white
 (iii) white and size 1

In a box of 400 such eggs how many size 1 white eggs would you expect to find?

4. (a) Copy the diagram into your answerbook and

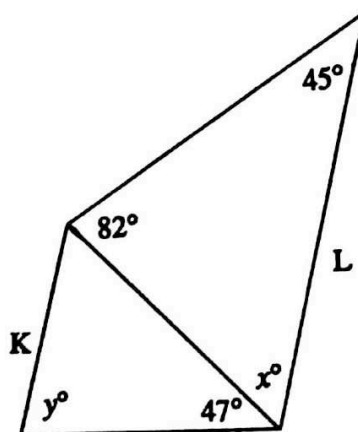


- (i) mark with * a pair of alternate angles
 (ii) mark with \square a pair of corresponding angles.

- (b) In the diagram $K \parallel L$.

Find

- (i) x
 (ii) y

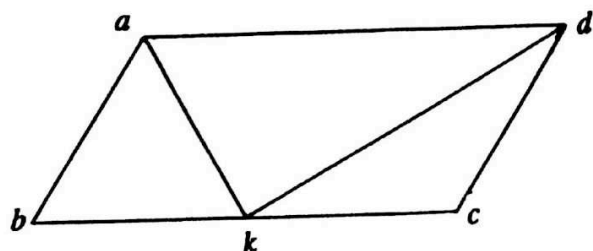


- (c) In the parallelogram

$$|ad| = 2|ab|$$

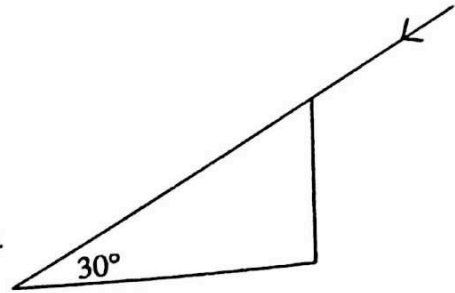
$$|bk| = |kc|$$

Say why the line ak bisects $\angle bad$.

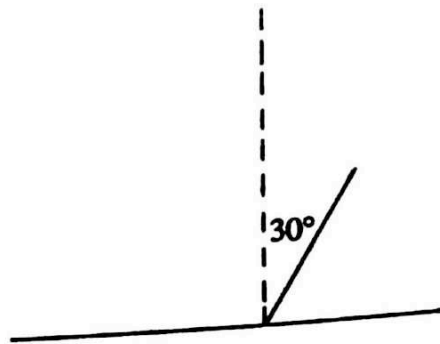


5. (a) A survey map is drawn to a scale of 1 to 10 000. The distance between two towns on the map is 25 cm. What is the actual distance in kilometers between the towns ?
- (b) h is the point $(-2, 5)$ and k is the point $(-2, -5)$.
 Show that the X axis bisects the line segment $[hk]$.
 t is the point such that the origin is the centre of $[ht]$. Find the coordinates of t .
 Verify that the Y axis bisects the line segment $[kt]$.

- (c) When the angle of elevation of the sun is 30° a vertical pole $\sqrt{3}$ units in length casts a shadow. Find the length of the shadow.



The diagram shows the same pole at an angle of 30° to the vertical. Find the length of its shadow when the sun is at the same angle of elevation as before.



6. p and q are two points having coordinates $(-1, 3)$ and $(5, -1)$, respectively.

Find

- (i) slope of pq
- (ii) k , the midpoint of $[pq]$.

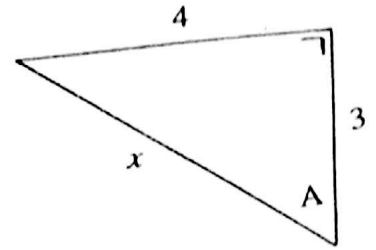
Find the equation of the line through k which is perpendicular to pq .

Test if this line contains the point $(4, 5)$.

OVER →

7. (a) (i) Calculate x

(ii) Write down the ratio for $\tan A$ and for $\sin A$.

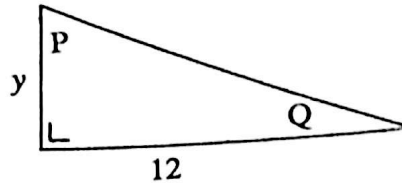


(b) Given that

$$\tan P = 2.4$$

find

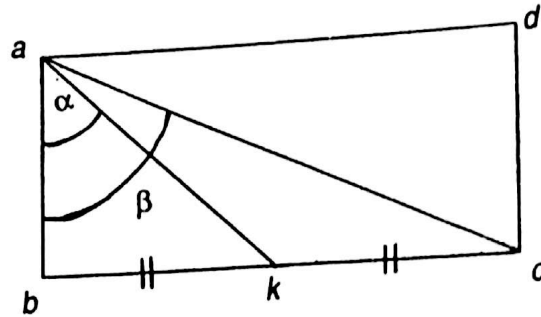
- (i) y
 (ii) Q



(c) $abcd$ is a rectangle and k is the midpoint of $[bc]$

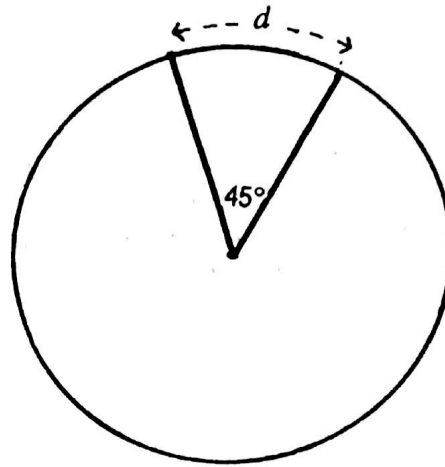
Show that

$$\tan \beta = 2 \tan \alpha$$



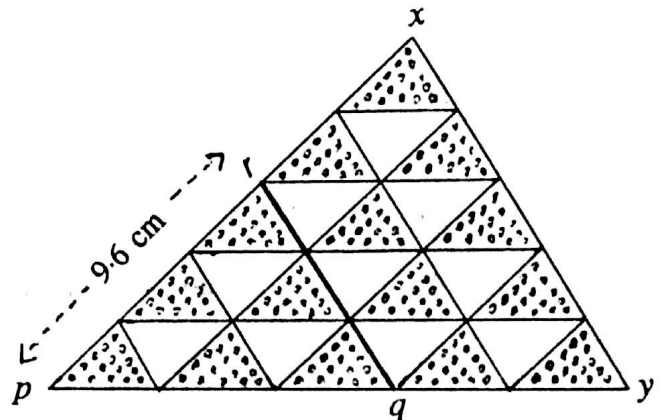
8. (a) Simplify $\frac{45}{360}$.

The diagram shows an angle of 45° at the centre of the circle of radius length 14 cm. Calculate the distance d using the ratio, above, and taking $\pi = \frac{22}{7}$.

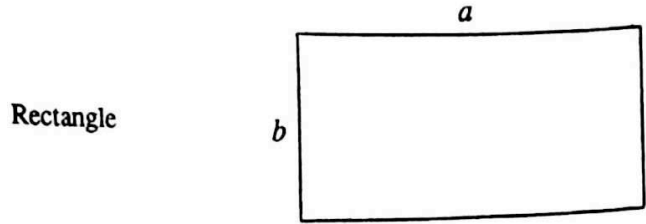


(b) The diagram represents a tile pattern and the Δpxy is an enlargement of the Δprq .

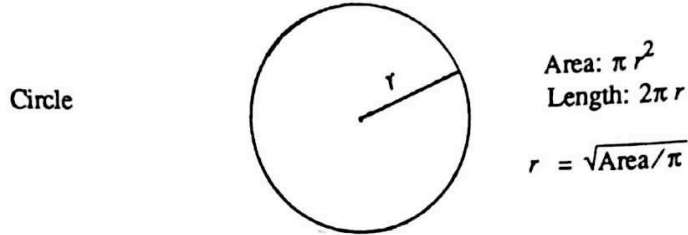
- (i) Name the centre of enlargement.
 (ii) Write down the scale factor of the enlargement.
 (iii) Calculate $|rx|$
 (iv) If the area of $\Delta prq = 36 \text{ cm}^2$, find the area of the Δpxy .



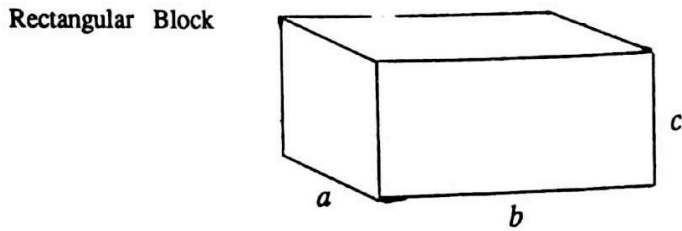
Formulae for Paper II



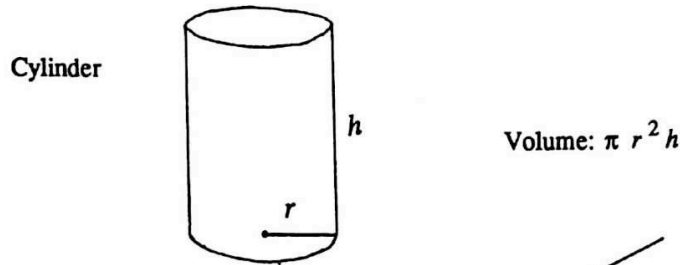
Area : ab
 Length : $2(a + b)$
 $b = \text{Area} / a$



Area: πr^2
 Length: $2\pi r$
 $r = \sqrt{\text{Area} / \pi}$



Volume: abc



Volume: $\pi r^2 h$



Slope formula: $\frac{y_2 - y_1}{x_2 - x_1}$

Midpoint formula: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

Equation of line: $y = mx + c$, or $y - y_1 = m(x - x_1)$

For perpendicular lines: $m_1 m_2 = -1$

Angle at centre of circle measures 360° .

