Maths B1

361

SAE 1014/0051/11

06/90

Centre Number	
Candidate Number	
Surname	
Signature	

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UNIVERSITY OF LONDON
SCHOOL EXAMINATIONS BOARD

General Certificate of
Education Examination

JUNE 1990 **ORDINARY LEVEL**

Subject Title	**Mathematics**
Syllabus	**Syllabus B**
Paper No./Title	**Paper 1**
Subject Code No.	**361**

For Candidates Overseas

One and a half hours

Instructions to Candidates

In the spaces above, write your centre number, your candidate number, your surname and your signature.

Answer ALL the questions in the spaces provided.

In calculations you are advised to show all the steps in your working, giving your answer at each stage.

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Answer ALL questions.

1. 350 g of cereal costs 56p. Find the cost, in pence, of 1 kg of this cereal.

(2 marks)

Answer .....

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2. Solve the equation $2(3x - 1) = 3(x + 2) + 7$.

(2 marks)

Answer .....

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3. A and B are two sets. Given that $n(A) = 12$ and $n(B) = 5$, find

(a) the greatest possible value of $n(A \cup B)$,

(b) the least possible value of $n(A \cup B)$.

(2 marks)

Answers (a) .....

(b) .....

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4. Given that x is an integer such that

$$3x - 5 < 11 \quad \text{and} \quad 2x - 7 > 1,$$

find the value of x.

(2 marks)

Answer .....

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5. In a school of 1200 pupils, 46% of the pupils are girls. Given that one sixth of the girls in the school are in the sixth form, find how many girls are in the sixth form.

(2 marks)

Answer .....

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6. Given that $(x + 2)$ is a factor of $x^3 + 5x^2 + ax + 2$,
find the value of a.

(2 marks)

Answer .....

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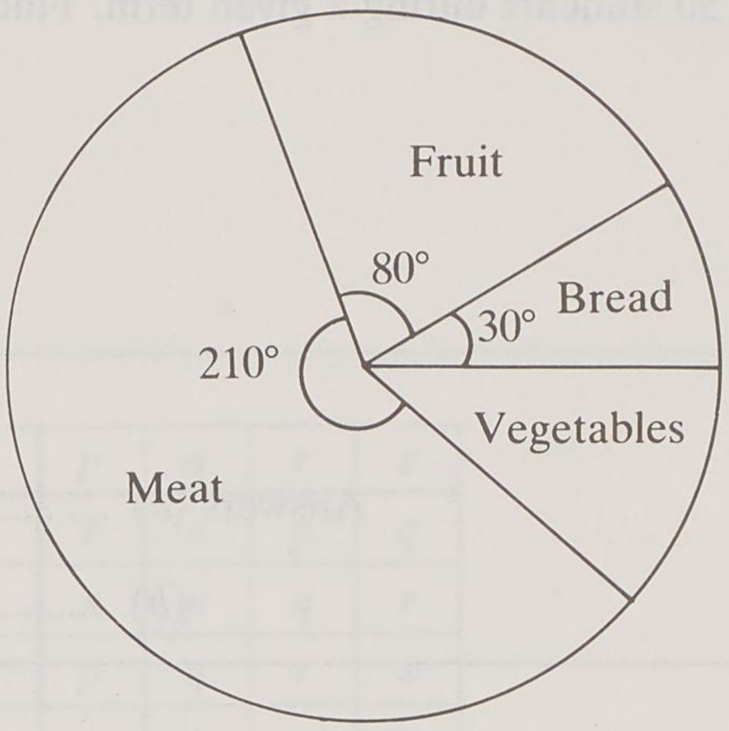
7. Each interior angle of a regular polygon is 150°. Find the number of sides of this polygon.

(2 marks)

Answer .....

8.



A family spends £4.80 during one week on vegetables. Use the pie chart, which shows the relative expenditure by the family, during the week, on fruit, meat, bread and vegetables, to calculate

(*a*) how much is spent on bread during the week,

(*b*) the total expenditure, for the week, on these items.

(3 marks)

Answers (*a*) .....

(*b*) .....

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9. Given that $x = ay + z$ find, in standard form, the value of x when $a = 30$, $y = 4 \times 10^5$ and $z = 5 \times 10^7$.

(3 marks)

Answer .....

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10. The equation of a curve is $y = x^3 + \frac{4}{x^2}$. Find the gradient of the curve at the point with coordinates (2,9).

(3 marks)

Answer .....

11.

Number of books	1	2	3	4	5	6	7	8
Frequency	8	9	10	11	5	4	2	1

The table shows the number of books read by 50 students during a given term. Find

(*a*) the median number of books read,

(*b*) the mean number of books read.

(3 marks)

Answers (*a*) .....

(*b*) .....

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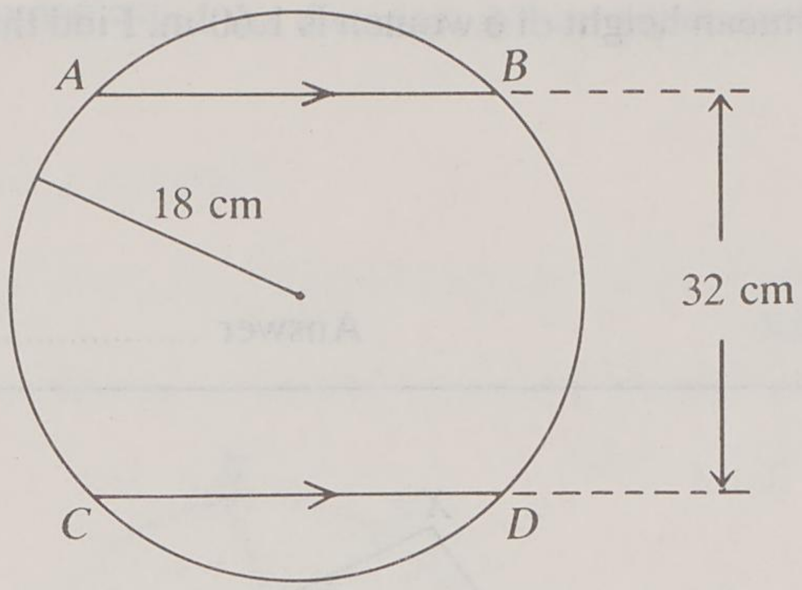
12.



The parallel chords AB and CD are equal in length and their distance apart is 32 cm. Given that the radius of the circle is 18 cm, find the length of AB in cm to 1 decimal place.

(3 marks)

Answer ..... cm

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13. Solve the simultaneous equations

$$4x - 3y = 10,$$
$$3x + 2y = -1.$$

(3 marks)

Answer .....

14.

$*$	p	q	r	s
p	r	s	p	q
q	s	p	q	r
r	p	q	r	s
s	q	r	s	p

The table defines the operation $*$ on the set $\{p, q, r, s\}$.

(a) Given that $p * y = s$, find y.

(b) Write down the identity element.

(c) Find the single element which is equivalent to $q * (p * s)$.

(3 marks)

Answers (a) .....

(b) .....

(c) .....

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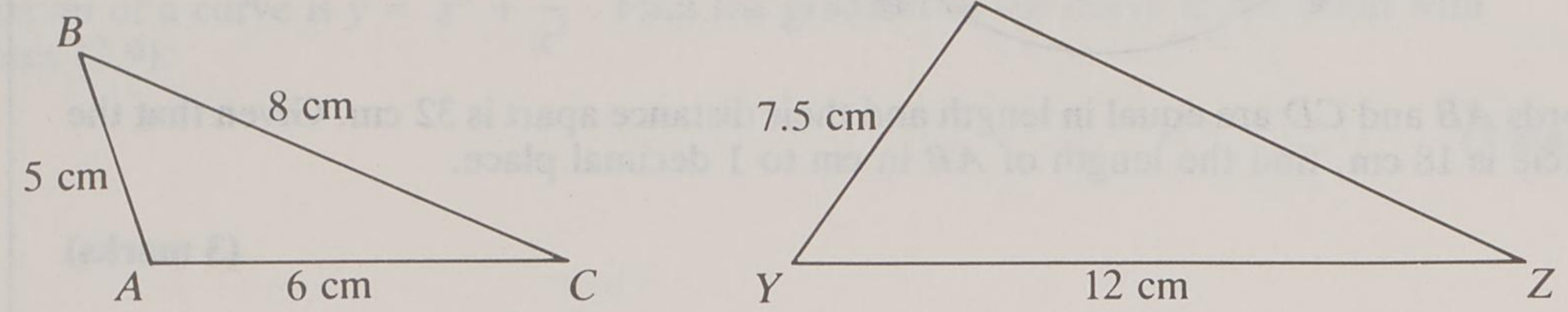
15. The mean height of 9 men is 1.70 m and the mean height of 6 women is 1.60 m. Find the mean height of the group of 15 men and women.

(3 marks)

Answer ..... m

16.



In the triangles ABC and XYZ, $\angle ABC = \angle XYZ$, $\angle BCA = \angle XZY$ and the lengths of the sides of the triangles are as shown. Calculate

(*a*) the length of ZX, giving a reason for your answer,

(*b*) the ratio (area of $\triangle XYZ$) : (area of $\triangle ABC$).

(3 marks)

Answers (*a*) .....

(*b*) .....

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17. Tom, Mary and Bill are aged 10, 12 and 15 years respectively. They share £259 in the same ratio as their ages. Find how much each receives.

(3 marks)

Answers Tom £ .....

Mary £ .....

Bill £ .....

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18. Given that $\mathbf{M} = \begin{pmatrix} 2 & 1 \\ -1 & 3 \end{pmatrix}$ and $\mathbf{N} = \begin{pmatrix} 1 & -2 \\ 3 & 5 \end{pmatrix}$, find

(*a*) $\mathbf{M} - \mathbf{N}$, **(3 marks)**

Answers (*a*) .....

(*b*) $\mathbf{MN}$.

(*b*) .....

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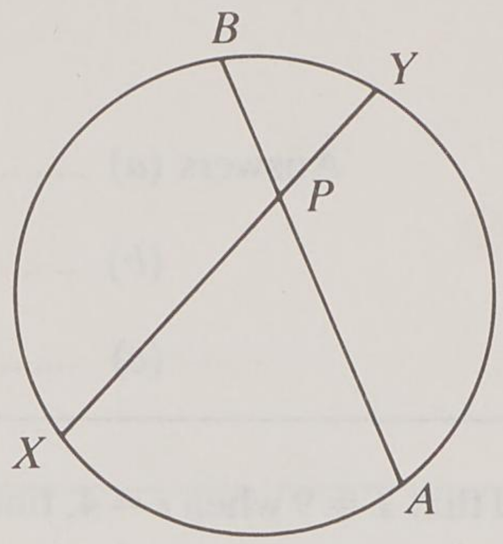
19. The scale of a map is 1 : 50 000. Find the distance, in km, represented by a length of 16 cm on the map.

(3 marks)

Answer ..... km

20.

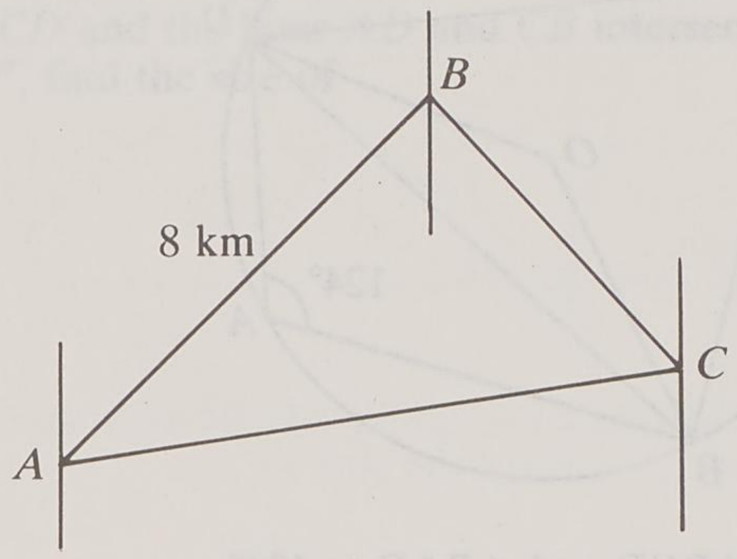


The chords AB and XY of a circle intersect at P.
Given that $PX = 6$ cm, $PY = 3$ cm, $AB = 11$ cm and PA is greater than PB, find the length of PA.

(4 marks)

Answer ..... cm

21.



The bearing of B from A is 040°.

The bearing of C from B is 130°.

The bearing of C from A is 075°.

Given that $AB = 8$ km,

(a) find the size of the angle BAC,

(b) calculate the distance AC giving your answer in km to 1 decimal place. **(4 marks)**

Answers (a) .....

(b) ..... km

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22. $\mathbf{a} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} -1 \\ 6 \end{pmatrix}$ and $\mathbf{c} = \begin{pmatrix} 5 \\ y \end{pmatrix}$.

Calculate

(*a*) the modulus of **a**, to 1 decimal place,

(*b*) $\mathbf{a} + \mathbf{b}$,

(*c*) the value of y given that **c** is parallel to $(\mathbf{a} - \mathbf{b})$.

(4 marks)

Answers (*a*) .....

(*b*) .....

(*c*) .....

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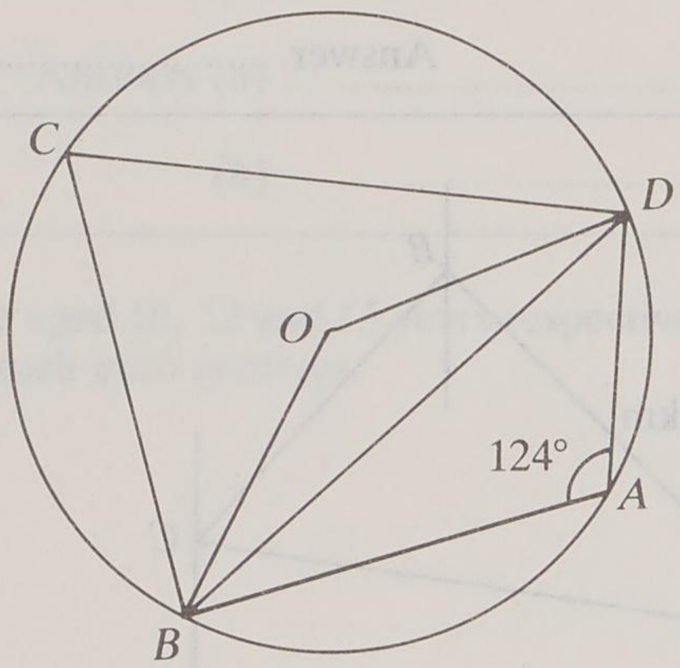
23. Given that T is inversely proportional to the square of r and that $T = 9$ when $r = 4$, find the value of T when $r = 8$.

(4 marks)

Answer .....

24.



O is the centre of the circle $ABCD$ and $\angle BAD = 124°$.

Calculate the size of

(*a*) $\angle BCD$,

(*b*) $\angle OBD$.

(4 marks)

Answers (*a*) .....

(*b*) .....

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25. Given that $T = 2\pi\sqrt{\left(\frac{l}{g}\right)}$,

(*a*) make l the subject of this formula,

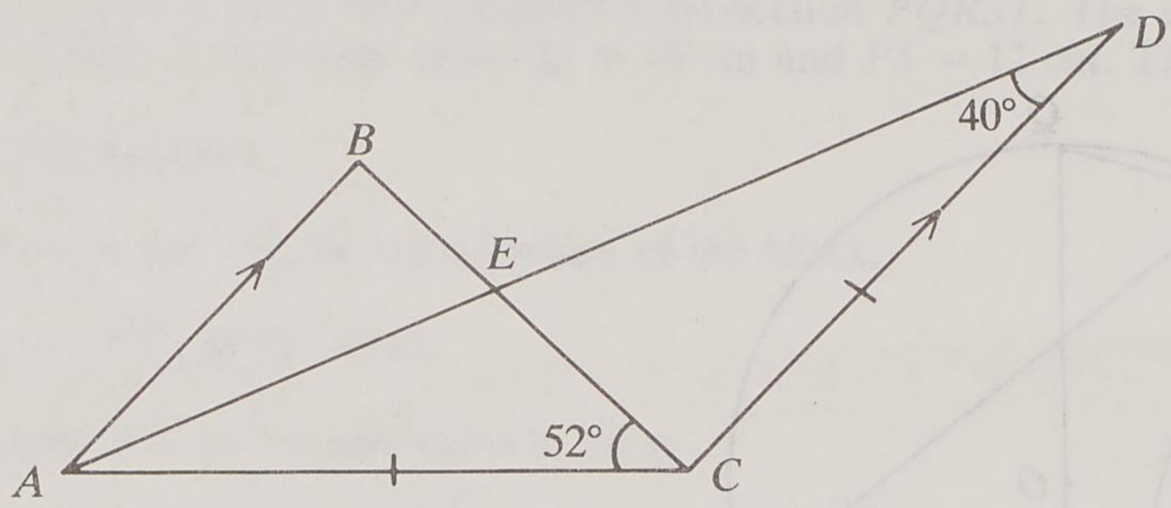
(*b*) calculate, to 1 decimal place, the value of l when $g = 10$, $\pi = 3.14$ and $T = 5$.

(4 marks)

Answers (*a*) .....

(*b*) .....

26.



In the figure $AC = CD$, AB is parallel to CD and the lines AD and CB intersect at the point E. Given that $\angle ADC = 40°$ and $\angle BCA = 52°$, find the size of

(*a*) $\angle ABC$,

(*b*) $\angle CED$.

(5 marks)

Answers (*a*) .....

(*b*) .....

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27. The diagonals of a rhombus are 12 cm and 18 cm in length.
Calculate

(*a*) the area, in cm^2, of the rhombus,

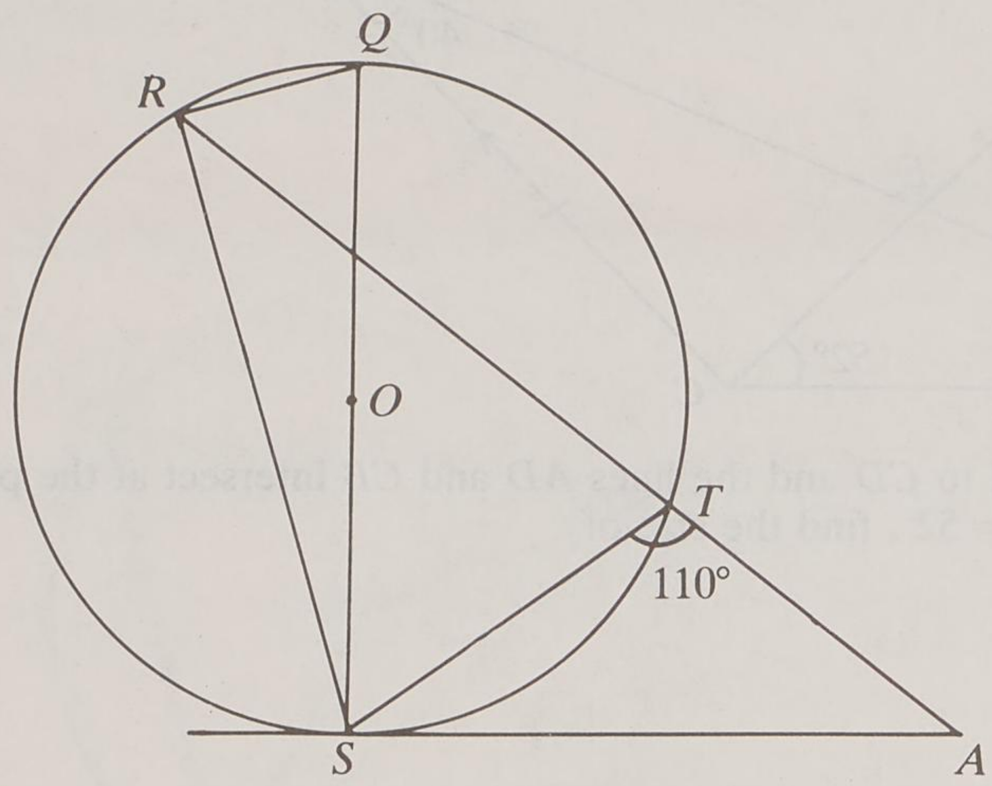
(*b*) the length, in cm to 1 decimal place, of one side of the rhombus.

(5 marks)

Answers (*a*) ..... cm^2

(*b*) ..... cm

28.



In the figure AS is a tangent at S to the circle $QRST$ which has centre O. $AT = TS$ and $\angle STA = 110°$.
Giving reasons for your answers, calculate the size of

(*a*) $\angle SRT$,

(*b*) $\angle RSQ$.

(5 marks)

Answers (*a*) .....

(*b*) .....

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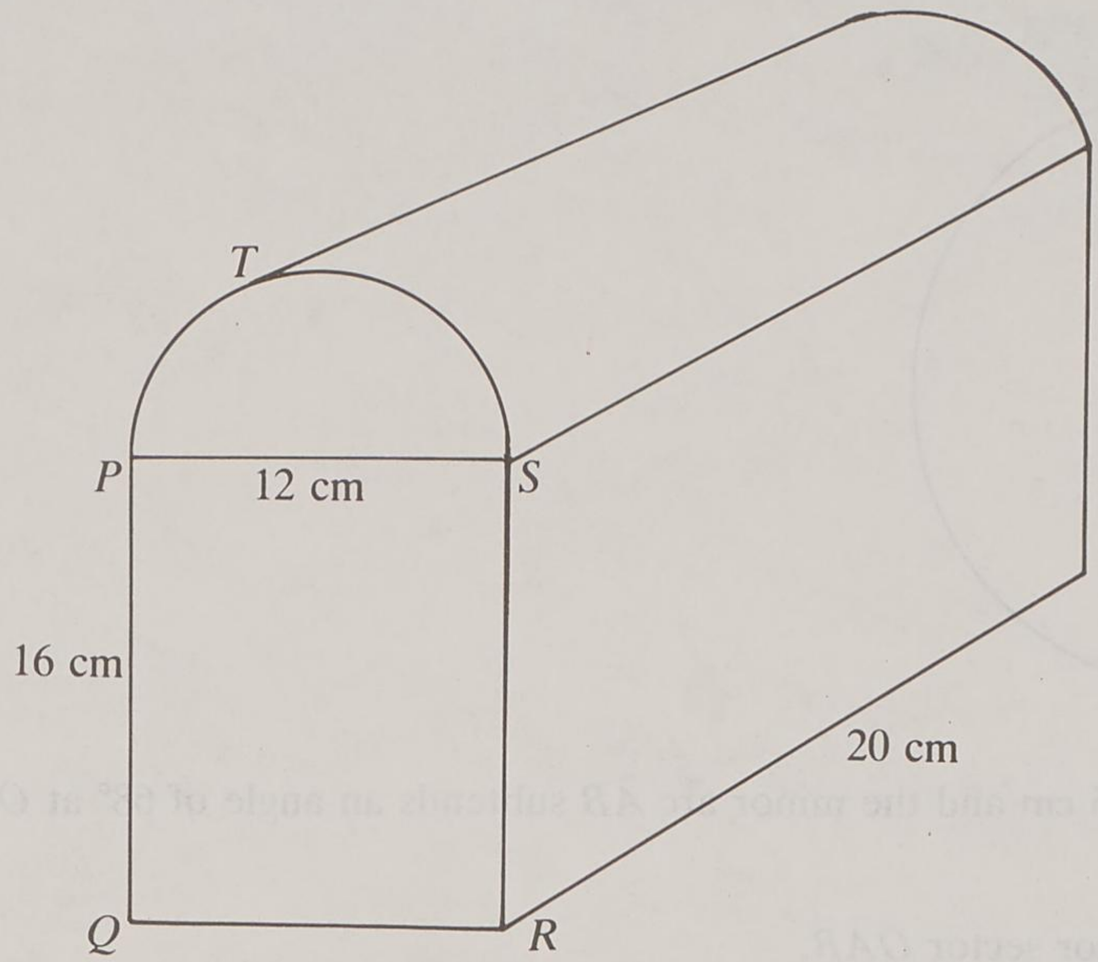
29.



The figure shows a metal block with uniform cross-section $PQRST$. The cross-section PST is a semicircle and $PQRS$ is a rectangle with $PQ = 16$ cm and $PS = 12$ cm. The length of the block is 20 cm.
Calculate, to 1 decimal place,

(*a*) the total area, in cm^2, of the cross-section of the block,

(*b*) the volume, in cm^3, of the block.

Given that the mass of 1 cm^3 of the metal is 7.6 g,

(*c*) calculate in kg, to 1 decimal place, the mass of the block.

(5 marks)

Answers (*a*) ..... cm^2

(*b*) ..... cm^3

(*c*) ..... kg

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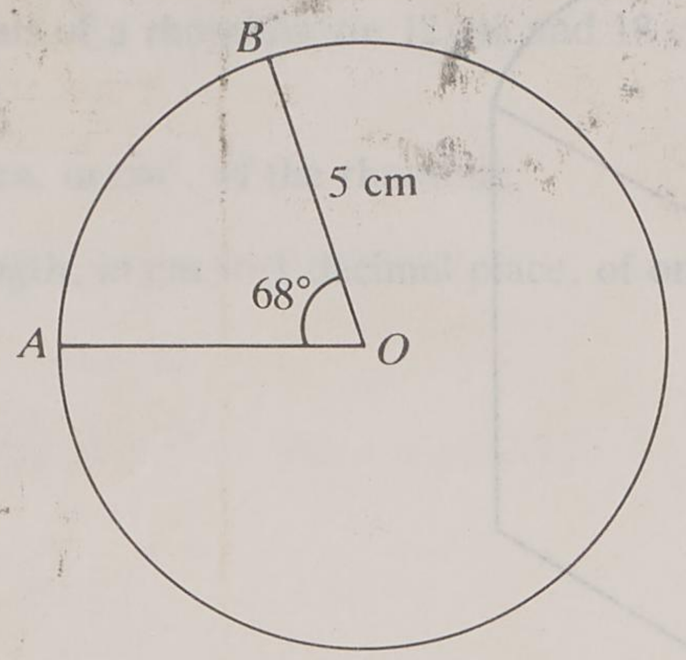
30.



The circle, centre O, has a radius of 5 cm and the minor arc AB subtends an angle of 68° at O. Calculate, to 1 decimal place,

(a) the perimeter, in cm, of the minor sector OAB,

(b) the area, in cm^2, of this sector.

(6 marks)

Answers (a) ..... cm

(b) ..... cm^2