

PRACTICE PAPER
MATHEMATICS Compulsory Part
PAPER 1
Question-Answer Book

(2¼ hours)

This paper must be answered in English

INSTRUCTIONS

1. After the announcement of the start of the examination, you should first write your Candidate Number in the space provided on Page 1 and stick barcode labels in the spaces provided on Pages 1, 3, 5, 7, 9 and 11.
2. This paper consists of THREE sections, A(1), A(2) and B.
3. Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.
4. Graph paper and supplementary answer sheets will be supplied on request. Write your Candidate Number, mark the question number box and stick a barcode label on each sheet, and fasten them with string INSIDE this book.
5. Unless otherwise specified, all working must be clearly shown.
6. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
7. The diagrams in this paper are not necessarily drawn to scale.
8. No extra time will be given to candidates for sticking on the barcode labels or filling in the question number boxes after the 'Time is up' announcement.

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Candidate Number



SECTION A(1) (35 marks)

1. Simplify $\frac{(m^5 n^{-2})^6}{m^4 n^{-3}}$ and express your answer with positive indices. (3 marks)

2. Make a the subject of the formula $\frac{5+b}{1-a} = 3b$. (3 marks)

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3. Factorize

(a) $9x^2 - 42xy + 49y^2$,

(b) $9x^2 - 42xy + 49y^2 - 6x + 14y$.

(3 marks)

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4. The cost of a chair is \$ 360 . If the chair is sold at a discount of 20% on its marked price, then the percentage profit is 30% . Find the marked price of the chair. (4 marks)

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5. The ratio of the capacity of a bottle to that of a cup is $4:3$. The total capacity of 7 bottles and 9 cups is 11 litres. Find the capacity of a bottle. (4 marks)

6. In a polar coordinate system, the polar coordinates of the points A , B and C are $(13, 157^\circ)$, $(14, 247^\circ)$ and $(15, 337^\circ)$ respectively.

- (a) Let O be the pole. Are A , O and C collinear? Explain your answer.
- (b) Find the area of $\triangle ABC$. (4 marks)

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7. In Figure 1, BD is a diameter of the circle $ABCD$. If $AB = AC$ and $\angle BDC = 36^\circ$, find $\angle ABD$.
(4 marks)

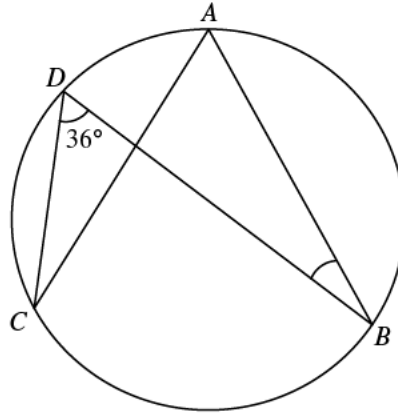


Figure 1

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9. The following table shows the distribution of the numbers of online hours spent by a group of children on a certain day.

Number of online hours	2	3	4	5
Number of children	r	8	12	s

It is given that r and s are positive numbers.

- (a) Find the least possible value and the greatest possible value of the inter-quartile range of the distribution.

- (b) If $r = 9$ and the median of the distribution is 3, how many possible values of s are there? Explain your answer.

(5 marks)

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11. Let C be the cost of manufacturing a cubical carton of side x cm . It is given that C is partly constant and partly varies as the square of x . When $x = 20$, $C = 42$; when $x = 120$, $C = 112$.

(a) Find the cost of manufacturing a cubical carton of side 50 cm . (4 marks)

(b) If the cost of manufacturing a cubical carton is \$ 58 , find the length of a side of the carton. (2 marks)

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12. Figure 2 shows the graphs for Ada and Billy running on the same straight road between town P and town Q during the period 1:00 to 3:00 in an afternoon. Ada runs at a constant speed. It is given that town P and town Q are 16 km apart.

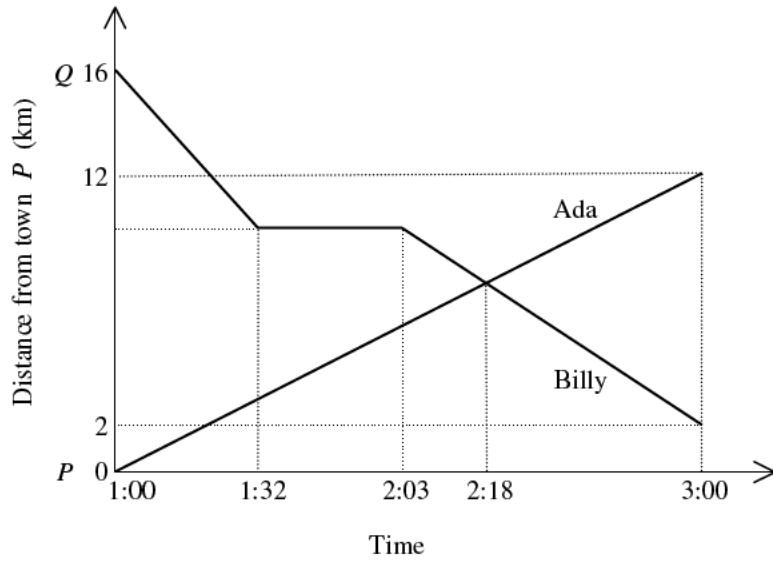


Figure 2

- (a) How long does Billy rest during the period? (2 marks)
- (b) How far from town P do Ada and Billy meet during the period? (3 marks)
- (c) Use average speed during the period to determine who runs faster. Explain your answer. (2 marks)

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14. In Figure 3, $OABC$ is a circle. It is given that AB produced and OC produced meet at D .

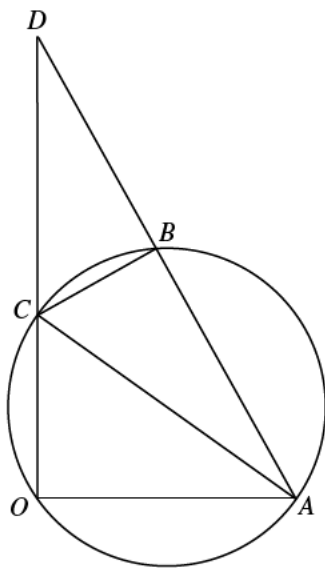


Figure 3

- (a) Write down a pair of similar triangles in Figure 3. (2 marks)
- (b) Suppose that $\angle AOD = 90^\circ$. A rectangular coordinate system, with O as the origin, is introduced in Figure 3 so that the coordinates of A and D are $(6, 0)$ and $(0, 12)$ respectively. If the ratio of the area of $\triangle BCD$ to the area of $\triangle OAD$ is $16 : 45$, find
- (i) the coordinates of C ,
 - (ii) the equation of the circle $OABC$.

(7 marks)

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18. Figure 4 shows a geometric model $ABCD$ in the form of tetrahedron. It is found that $\angle ACB = 60^\circ$, $AC = AD = 20$ cm, $BC = BD = 12$ cm and $CD = 14$ cm.

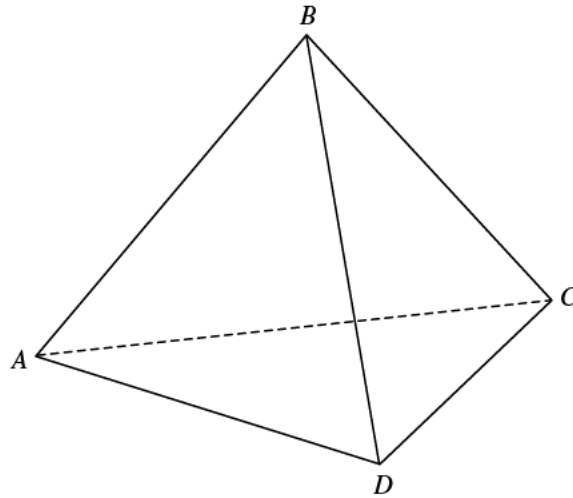


Figure 4

- (a) Find the length of AB . (2 marks)
- (b) Find the angle between the plane ABC and the plane ABD . (4 marks)
- (c) Let P be a movable point on the slant edge AB . Describe how $\angle CPD$ varies as P moves from A to B . Explain your answer. (2 marks)

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