

MOCK EXAM 3
MATHEMATICS Compulsory Part
PAPER 1
Question-Answer Book

Name: _____

(2 $\frac{1}{4}$ hours)

This paper must be answered in English

INSTRUCTIONS

1. Write your name in the space provided on Page 1.
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 name on the graph paper and supplementary answer sheets.
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.

3. The table below shows the distribution of the numbers of children in some families.

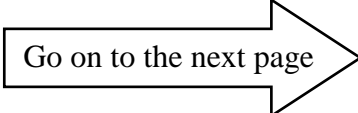
Number of children	0	1	2	3	4
Number of families	5	20	17	6	2

Find the median, the mode and the standard deviation of the above distribution. (3 marks)

4. Consider the formula $3(x - 2y) = 6x - 4$.

- (a) Make y the subject of the above formula.
- (b) If the value of x is increased by 4, write down the change in the value of y . (4 marks)

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5. The price of 5 rulers and 6 pens is \$73 while the price of 7 rulers and 9 pens is \$107. Find the price of a pen. (4 marks)

6. In a polar coordinate system, O is the pole. The polar coordinates of A, B and C are $(16, 59^\circ)$, $(12, 239^\circ)$ and $(11, 329^\circ)$ respectively.
- (a) Describe the geometric relationship between OC and AB.
- (b) Find the area of $\triangle ABC$. (4 marks)

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7. In Figure 1, D is a point lying on BC such that $\angle DAC = \angle ABD$.

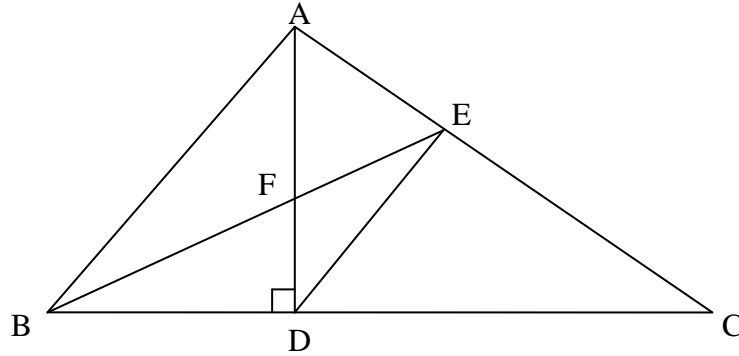


Figure 1

- (a) Prove that $\triangle ABC \sim \triangle DAC$.
- (b) If $\angle DEC = 90^\circ$,
 - (i) Write down all the triangle(s) which is/are similar to $\triangle ABC$ other than $\triangle DAC$.
 - (ii) Write down another pair of similar triangles other than those in (i). (4 marks)

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9. In Figure 2, the volume of the solid right prism ABCDEFGH is $1\,440\text{ cm}^3$. The base ABCD of the prism is a rhombus. It is given that $AC = 16\text{ cm}$ and $DE = 15\text{ cm}$.

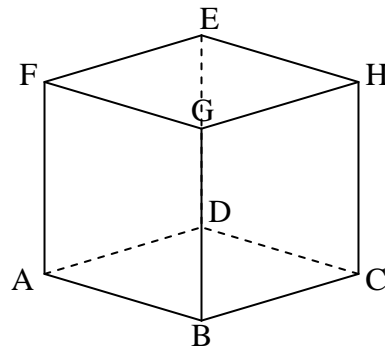


Figure 2

Find

- (a) the length of BD,
- (b) the total surface area of the prism ABCDEFGH. (5 marks)

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12. Figure 3 shows a frustum with the height of 8 cm. The radii of the upper surface and lower surface are in the ratio of 3 : 5 and the volume of the frustum is $1176\pi \text{ cm}^3$.

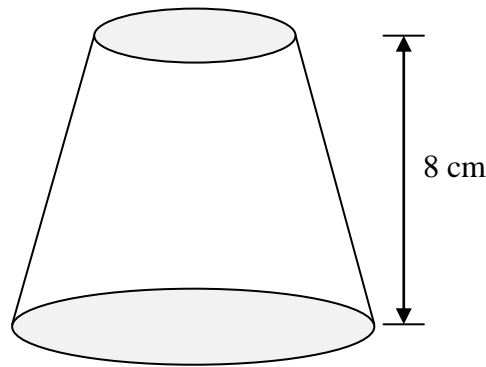


Figure 3

- (a) Find the radius of the upper surface. (3 marks)
- (b) Someone claims that the curved surface area of the frustum is larger than $250\pi \text{ cm}^2$. Do you agree? Explain your answer. (4 marks)

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16. There are 8 white socks and 10 black socks in a drawer.

(a) If 2 socks are randomly drawn from the drawer at the same time, find the probability that 2 socks of the same colour are drawn. (2 marks)

(b) If 6 socks are randomly drawn from the drawer at the same time, find the probability that at least 4 black socks are drawn. (2 marks)

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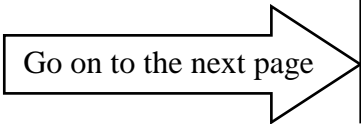
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18. (a) In Figure 5, the equation of the straight line L_1 is $4x + 11y = 1080$ and the y-intercept of the straight line L_2 is 140. L_1 and L_2 intersect at the point (50, 80). The shaded region (including the boundary) represents the solution of a system of inequalities. Find the system of inequalities. (4 marks)

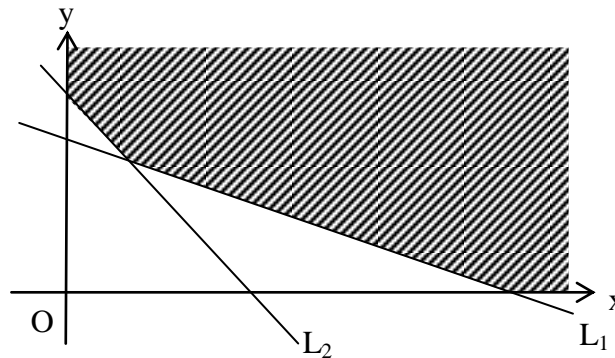


Figure 5

- (b) A factory produces two types of T-shirts, X and Y. Each T-shirt X requires 4 units of polyester and 6 units of cotton for production while each T-shirt Y requires 11 units of polyester and 5 units of cotton for production. The supplier requires the factory to order at least 1080 units of polyester and 700 units of cotton. The costs for producing a T-shirt X and a T-shirt Y are \$30 and \$48 respectively. The manager claims that the total cost of producing the T-shirts always exceed \$5 000. Do you agree? Explain your answer.

(4 marks)

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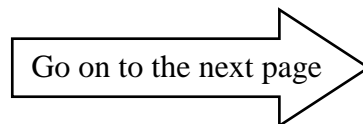
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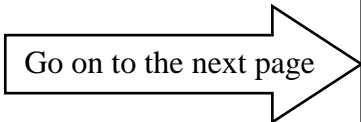
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