

Module: MAT 404 (Mathematics in Upper Primary 2) **Programme B. Ed (P)** **Level:** IV

Writing time: 3 hours

Full marks: 100

Direction:

Do not write during the first 15 minutes. Use this time for reading the questions. You will get full three hours for answering the questions. Write the answers to all the questions in the answer sheets provided. This paper contains SIX questions. All questions carry equal marks and the intended marks are given in brackets. Attempt any FIVE questions. You are NOT allowed to use any electronic devices such as calculators, mobile phones etc. You will be supplied with necessary grid papers such as Isometric dot grid and graph papers to answer some of the questions.

Question 1

- a) There are 60 people and all play at least football or basketball or both. 45 play football and 40 play basketball. What is the probability that someone chosen at random:

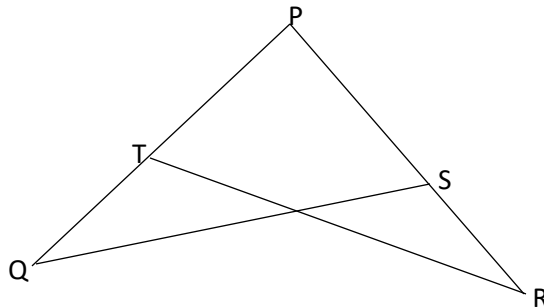
i) play both football and basketball?

ii) play only football?

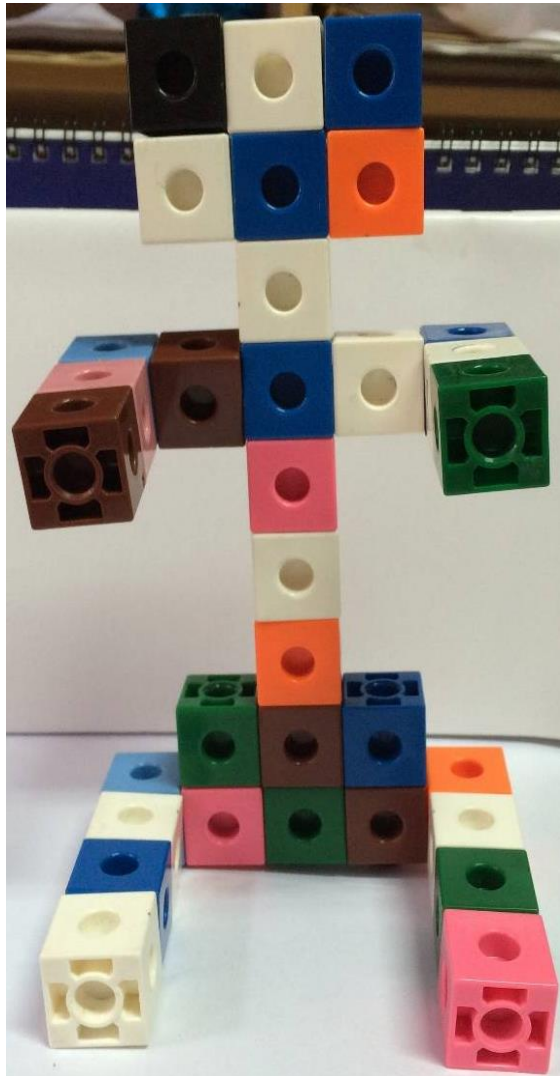
iii) play only basketball?

[4 + 2 + 2 = 8]

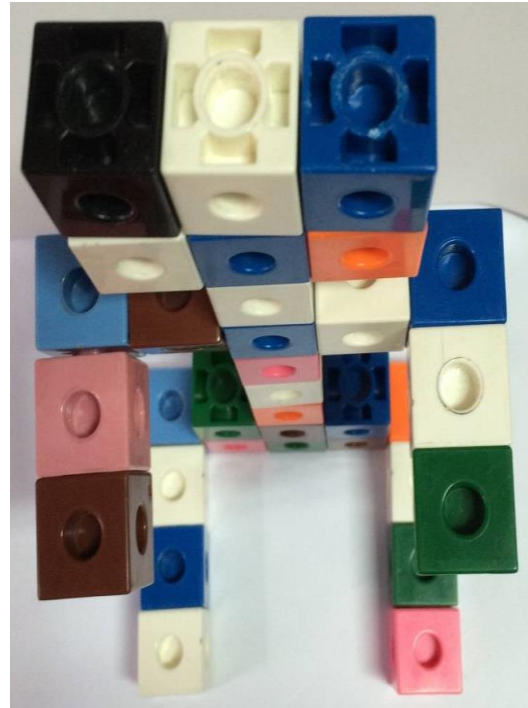
- b) In the figure given, $PQ = PR$ and $\angle PQS = \angle PRT$. Prove that $\triangle PQS \cong \triangle PRT$. [4]



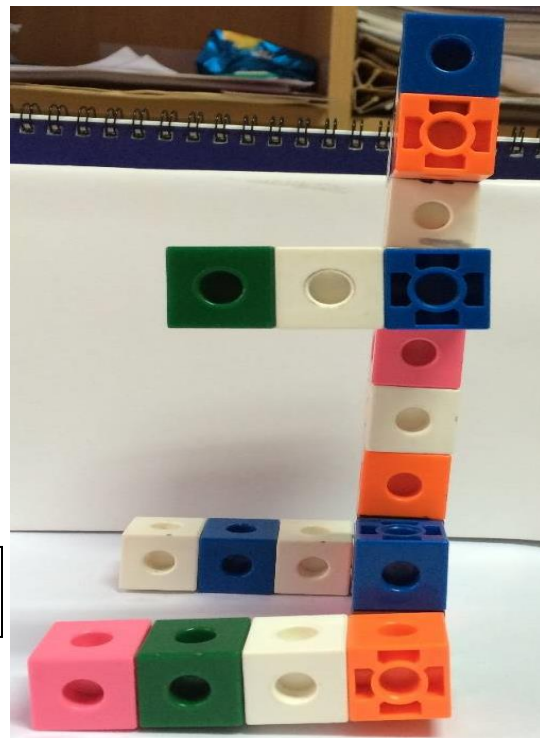
- c) Draw the object using isometric dot paper. You are provided with top view, front view and right view of the same object. Draw the object. [8]



Front View



Top View



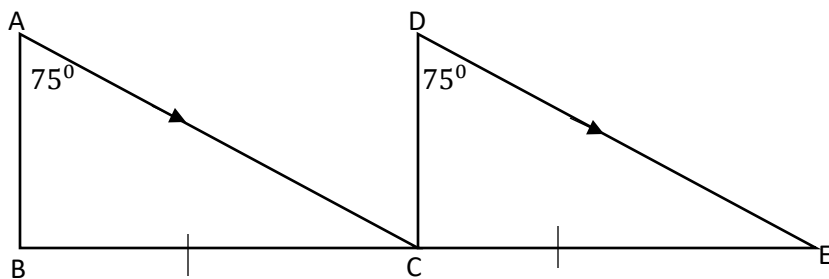
Right View

Question 2

- a. The coordinates of the figure ABCD are A(-2, 3), B(1, 3), C(1, 2) and D(-2, 2). [1+3+3]
- Plot the figure ABCD.
 - Rotate the figure ABCD by 90° clockwise to $A'B'C'D'$.
 - Dilate the image $A'B'C'D'$ to $A''B''C''D''$ using the centre of dilation as (-7, -8) and the mapping function: $P(x, y) \rightarrow \frac{3}{2}(x, y)$.
- b. Factor $9x^2 - 4y^2$ by using: [3 + 5]
- algorithm
 - algebra tiles
- c. 5 cards are selected at random. If a winning hand is two red Jacks and 3 diamonds, what is the probability of winning? [5]

Question 3

- a. Prove that $\triangle ABC \cong \triangle CDE$. You are expected to explain, illustrate and calculate wherever necessary. [4]



- b. The coordinates of the figure PQR are P(-1, 1), Q(-5, 4) and C(0, 4). [2 + 2 + 2]
- Plot the figure PQR.
 - Reflect the figure PQR in the axis $X = 2$.

iii. Translate the reflected image $P'Q'R'$ according to the mapping function

$$P'(x, y) \rightarrow P''(x - 2, y - 7).$$

c. 2 dice are rolled. What is the probability that: [3 + 3 + 2 + 2]

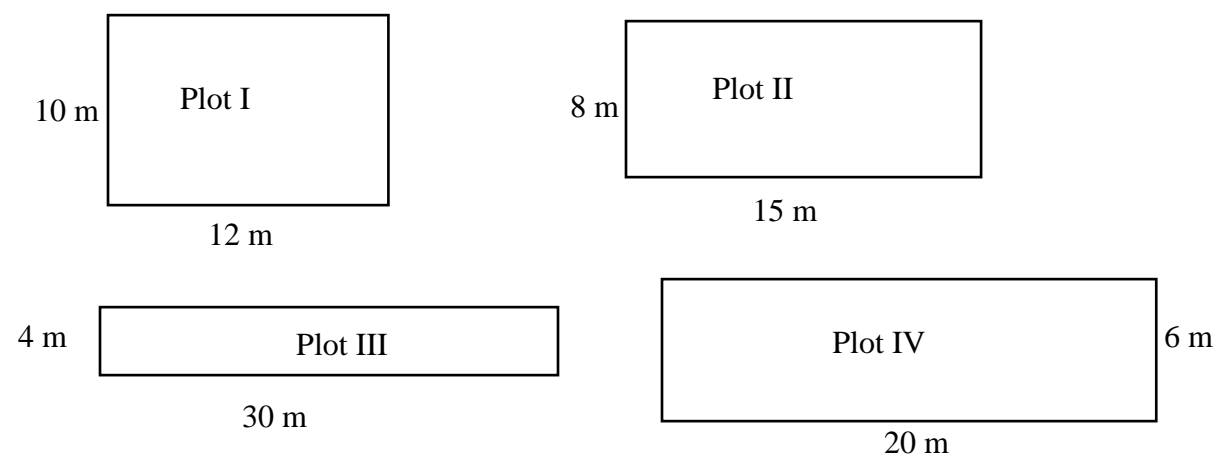
- i) the sum = 13?
- ii) the product < 23?
- iii) the difference of the two = 2?
- iv) product is not multiples of 2?

Question 4

- a. Derive the formula to find the area of a right triangle. [10]
- b. i) Frame a question to construct an acute angle isosceles triangle using ASA postulate. [2]
ii) Construct the above triangle with all the steps and explain wherever necessary. [8]

Question 5

- a. Derive the formula to find the area of a rectangle. [8]
- b. There are 4 plots with the following dimension. All the plots are equally fertile and equally productive. Choose one plot to grow vegetables. Explain why you chose that particular plot. Your answer has to be logical and mathematically correct. [6]



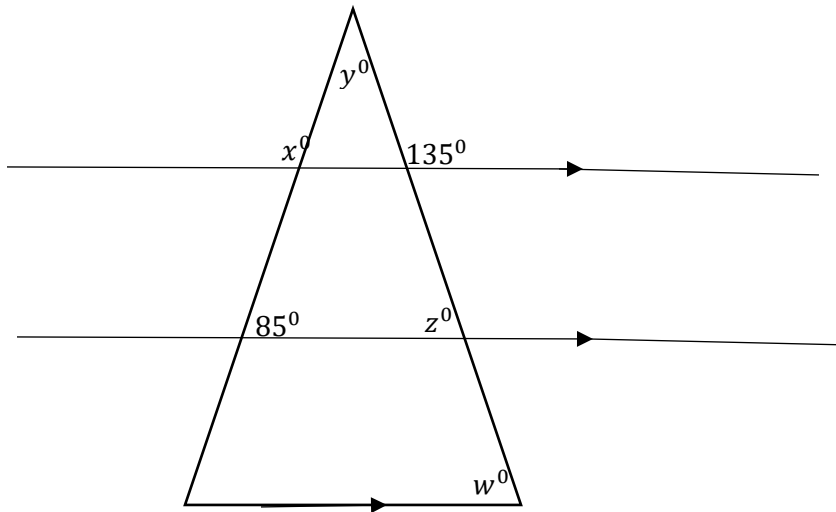
- c. Show or derive that $x^2 - y^2 = (x - y)(x + y)$. [6]

Question 6

- a. A number is chosen at random from the set of two-digit numbers from 10 to 49 inclusive. What is the probability: [8]

- i. that the number contains at least one digit 2?
- ii. multiples of 3 and multiples of 4?
- iii. multiples of 2 or multiples of 5?
- iv. factors of 50?

- b. Find the values of the following angles marked w° , x° , y° and z° . [6]



- c. There are 4 plots with the following dimension. All the plots are in the urban area. Choose one plot to construct a house. Explain why you chose that particular plot. Your answer has to be logical and mathematically correct. [6]

