

Royal University of Bhutan
Paro College of Education
Autumn Semester Examination – 2012

B.Ed(P) IV – Math in Upper Primary II (MAT404)

Full mark: 100

Pass mark: 50

Time: 3 hours

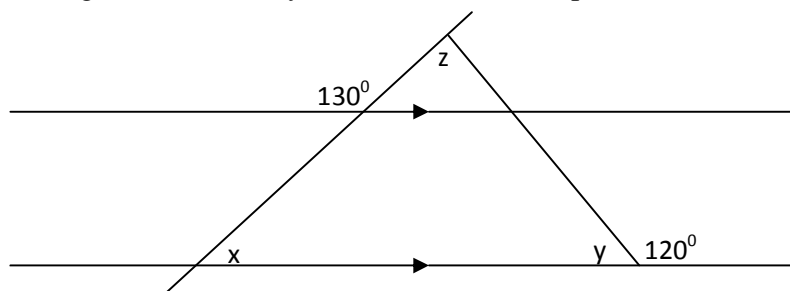
Instructions

You are not allowed to use any electronic device. You are provided with 5 grid papers and 1 isometric dot paper to answer some of the questions.

This paper contains six questions. All questions carry 20 marks each. You can answer ANY FIVE questions. Marks for each question is given in the bracket.

Question 1

- a. Use a pair of compasses and ruler to construct a triangle ABC where $AB=6\text{cm}$, $AC=7\text{cm}$ and angle $ABC=105^\circ$. Show all arcs, points clearly. (5)
- b. Find the value of the angle of the triangle marked x , y , z in the diagram below. Explain, calculate and give reasons for your answer wherever possible. (8)



- c. Show through construction that $x^2 - y^2 = (x + y)(x - y)$. Explain if necessary. Show all your construction and solution in detail. (7)

Question 2

- a. Factor $x^2 - 2xy + y^2$ using algebra tiles. Show the factors clearly. You are expected to explain your answer. (7)
- b. Derive a formula to find the sum of the first n natural numbers. Then find the sum of the first 250 natural numbers using the formula. (6)
- c. Derive a formula to calculate the n^{th} hypotenuse of a Pythagorean spiral whose 1st hypotenuse is $H_1 = \sqrt{2}$ and the other two sides are 1cm each. Use the formula to find the H_{157} . (7)

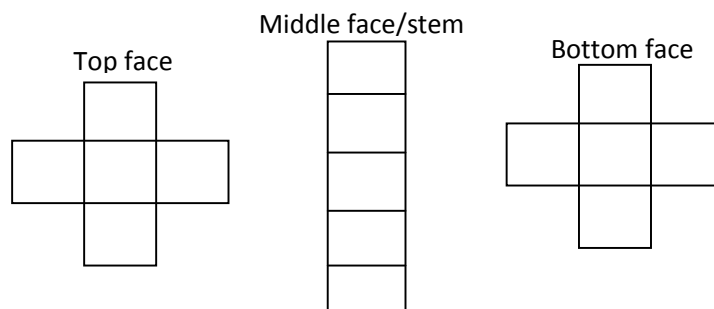
Question 3

Draw a sketch of an irregular rock. Explain how you are going to find the:

- surface area of the rock (10)
- volume of the rock. (10)

Question 4

You are given 2D faces of a 3D diagram. The faces are given below. Draw a 3D diagram in the isometric grid. (10)



- Graph the following pair of equations and find the solution graphically. Use coordinates to draw the graph. Use the grid paper provided to draw the graph. (5)
 $2x + 3y = 13$ and $x - y = -1$
- Find the solution of the equations $2x - 3y = 1$ and $2x + 2y = 16$. Use intercept to draw the graph. (5)

Question 5

- A dresser drawer contains one pair of socks with each of the following colours: blue, brown, red, white and black. Each pair is folded together in a matching set. You reach into the sock drawer and choose a pair of socks without looking. You replace this pair and then choose another pair of socks. What is the probability that you will choose the red pair of socks both times? (7)
- Rotate the triangle ABC 90° clockwise where A(2,3), B(-4,-5) and C(-2,2) in the grid paper provided. (6)
- A coin is tossed and a single 6-sided die is rolled. Find the probability of landing on the head side of the coin and rolling a 3 on the die. (7)

Question 6

- Rotate the triangle ABC 90° clockwise where A(2,-4), B(-4,2) and C(-2,3) and translate as following: $(x,y) \rightarrow 2(x-1, y+2)$ in the grid paper provided. (7)
- A jar contains 3 red, 5 green, 2 blue and 6 yellow marbles. A marble is chosen at a random from the jar. After replacing it, a second marble is chosen. What is the probability of choosing a green and then a yellow marble? (7)
- The figure A(1,4), B(2,6), C(3,4) and D(2,5) is translated as per the following translation: $(x,y) \rightarrow (x+3, y-2)$. Sketch the pre-image and the image. (6)