Grade 8 Math Model Paper 5

MODEL PAPER

Full marks 50 · 2 hours

Name _____ Class _____ Roll no. ____ Date _____ Marks _____ / 50

All questions are compulsory. Time: 2 hours.

A practice paper by Science Playground, made to CDC's Specification Grid 2078, Mathematics, Grades 6–8; not an official CDC or exam board paper. Mark it yourself online: the QR code below opens the paper with its answers.

A full practice run of the BLE Mathematics paper: 50 marks in 2 hours, 12 questions, every one compulsory. The marks of each part are in brackets. Show your working on paper as in the exam hall, then open each part's answer and give yourself the marks its scheme allows. You need graph paper for Questions 7 and 11, and a ruler and a compass for Question 10.

Question 1 — 3 marks

Sneha runs a juice stall in Janakpur. She keeps four fruits:

$$F = \{\text{mango}, \text{litchi}, \text{banana}, \text{guava}\}$$

A glass can have any of them in it, so each glass she can pour is a subset of F.

a. What is an improper subset of a set? **[1]**

b. How many subsets does F have? **[1]**

c. Sneha's board says, "16 different juices." Is this right? Give a reason. **[1]**

Question 2 — 5 marks

Amisha keeps bees in Chitwan.

a. Her 8 hives give 96 kg of honey in a season. At the same rate, how much honey do 11 hives give? **[1]**

b. Her calculator shows $0.454545\ldots$ for one of her sums. Convert $0.\overline{45}$ into a fraction in its lowest terms. **[2]**

c. She borrows Rs 40,000 at 12% simple interest a year for new hives, and pays it back after 9 months. How much interest does she pay? **[1]**

d. Amisha and her partner share a profit of Rs 90,000 in the ratio $3{:}2$. The partner asks to share it in the ratio $5{:}4$ instead. Would the partner get more that way? Give a reason. **[1]**

Question 3 — 4 marks

Sushant teaches computers at a school in Tulsipur. He writes the number 324_5 on the board.

a. Which digits are used in the quinary number system? **[1]**

b. Convert 324_5 into the decimal number system. **[1]**

c. Write the same number in the binary number system. **[2]**

Question 4 — 5 marks

Deepa has a phone shop in Itahari.

a. If the marked price and the discount are represented by MP and D respectively, write the formula to find the selling price. **[1]**

b. She marks a phone at Rs 32,000 and sells it for Rs 27,200. What percent of discount does she give? **[2]**

c. A supplier marks a box of chargers at Rs 20,000 and lets Deepa choose: one discount of 20%, or a discount of 10% and then a further 10% on the reduced price. Her helper says, "Both are 20% off, so they are the same." Is he right? Which should she choose? **[2]**

Question 5 — 5 marks

Prabin has made a flower bed $ABCD$ in the shape of a rhombus at his home in Dhulikhel. Its diagonals AC and BD are 16 m and 12 m long.

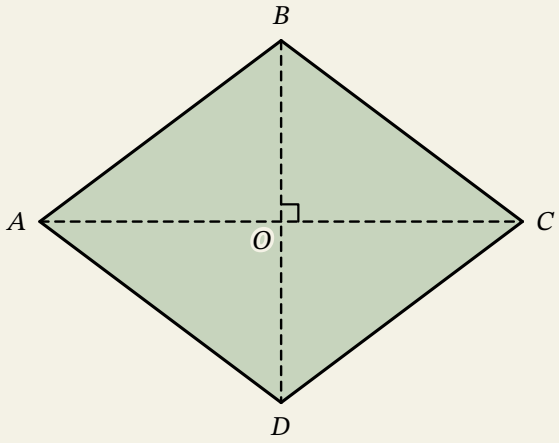


Figure 1 The flower bed.

a. Write the formula to find the area of a rhombus with diagonals d_1 and d_2. **[1]**

b. Find the area of the bed. **[1]**

c. What length of fencing does he need to go once round the bed? **[2]**

d. Prabin says, "If I use the same 40 m of fencing and make the bed a square, it will have the same area, because the sides don't change." Is he right? Give a reason. **[1]**

Question 6 — 3 marks

a. What do we do to divide one algebraic fraction by another? **[1]**

b. Simplify: $\left(\frac{2x^2}{y}\right)^3 \times \frac{y^4}{4x^5}$ **[2]**

Question 7 — 3 marks

On the plan of a new town near Nepalgunj, where 1 unit is 1 km, one straight road follows the line $y = 2x - 1$ and another follows the line $x + y = 5$.

a. At least how many points do we need to draw a straight line on a graph? **[1]**

b. Find, by using a graph, the point where the two roads cross. **[2]**

Question 8 — 4 marks

a. Find the highest common factor (HCF) of $2x^2 - 8x$ and $x^2 - x - 12$. **[2]**

b. For a school program in Lahan, Nirajan sets out 96 chairs in equal rows. The number of rows is 4 less than the number of chairs in a row. Make a quadratic equation to find the number of chairs in a row. If 100 guests come, will one more row of the same size be enough? **[2]**

Question 9 — 4 marks

Sudip's class in Kirtipur is making things for the school's exhibition: a wall of tiles, a set of shelves and some paper solids.

a. The tiles of the wall cover it with no gaps. What do the angles at a corner of a tessellation add up to? **[1]**

b. In the figure, the shelves AB and CD are parallel, and EF is a slanting support. Find the value of x. **[2]**

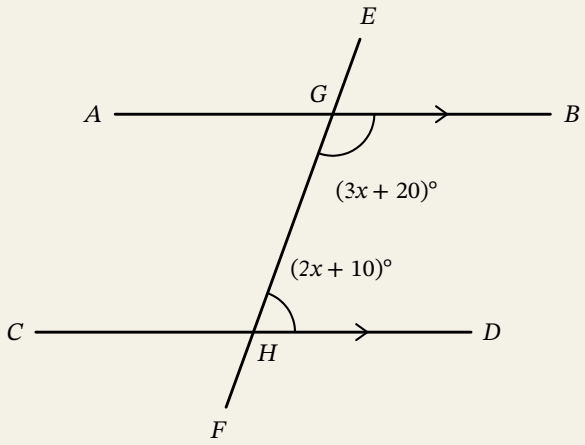


Figure 3 $AB \parallel CD$, $\angle BGH = (3x + 20)^\circ$ and $\angle DHG = (2x + 10)^\circ$.

c. To make a tetrahedron, Sudip cuts the shape below from card. He says, "It has four equal triangles, so it will fold into a tetrahedron." Is he right? Give a reason. **[1]**

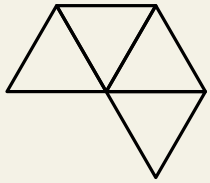


Figure 4 Sudip's shape of four triangles.

Question 10 — 5 marks

a. With a ruler and a compass, construct a rectangle $ABCD$ with $AB = 7$ cm and $AD = 4.5$ cm. **[3]**

b. Roshan, a carpenter in Bhaktapur, checks that a door frame is square at its corners by measuring its two diagonals. Draw the diagonals AC and BD of your rectangle. Prove that $\triangle ABC \cong \triangle BAD$, and write what this tells Roshan about the diagonals. **[2]**

Question 11 — 6 marks

Yasmin draws her school's garden in Tansen on graph paper, with the Y-axis pointing north and 1 unit for 1 m. The figure shows a flower bed LMN.

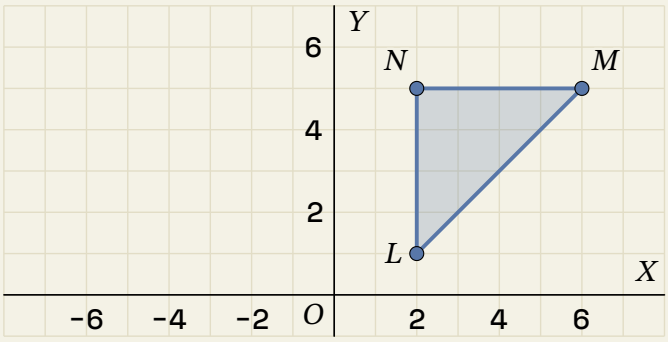


Figure 7 $\triangle LMN$ **on a grid.**

a. Write the length of LN, which is parallel to the Y-axis. **[1]**

b. Find the bearing of M from L, and then the bearing of L from M. **[2]**

c. A second bed is to be the mirror image of the first across the Y-axis. Reflect $\triangle LMN$ in the Y-axis. Draw the image on the same graph, and write the coordinates of L', M' and N'. **[3]**

Question 12

3 marks

Binita sells milk from her cows in Banepa. Her notebook shows the liters she sold on six days, but one number is smudged. She remembers that the mean was 14 liters.

Day	1	2	3	4	5	6
Milk (liters)	12	15	x	18	11	16

a. What was the total milk sold in the six days? **[1]**

b. Find the smudged number x, and then the mode of the data. **[2]**