Grade 8 Math Model Paper 2

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

Jenisha and her friends in Baglung play a word game with letter cards. In the Venn diagram, U is the set of all their cards, V is the set of vowels and W is the set of the letters of the word GANDAKI.

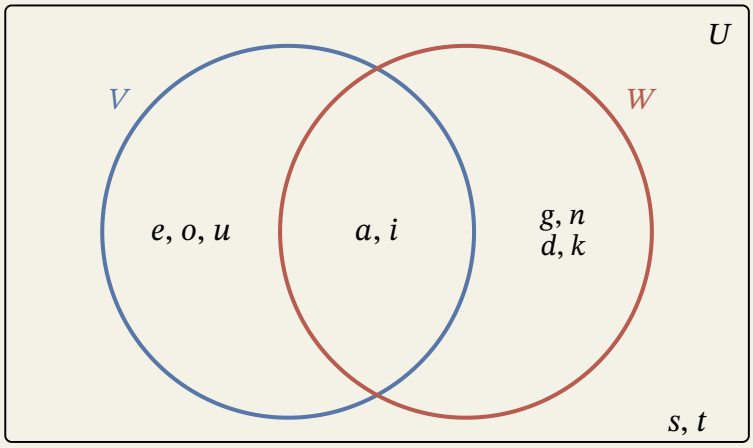


Figure 1 The letter cards.

a. What is a universal set? **[1]**

b. Write all the subsets of the set of letters that are common to V and W. **[1]**

c. Which letters must be taken out of W to make V and W disjoint sets? Give a reason. **[1]**

Question 2 — 4 marks

Sabina runs a small tailoring shop in Pokhara. She borrows Rs 75,000 from a cooperative at 14% simple interest a year to buy two sewing machines.

a. In the formula $I = \dfrac{P \times T \times R}{100}$, what do P, T and R stand for? **[1]**

b. How much interest does the loan make in one year? **[1]**

c. After how long will the interest be Rs 31,500? **[2]**

Question 3 — 5 marks

Abdul makes laddus in a sweet shop in Birgunj.

a. His recipe keeps to the proportion $2:5::6:15$. Write the extremes of this proportion. **[1]**

b. 6 workers make 2,400 laddus in 4 days. At the same rate, in how many days will 8 workers make 4,000 laddus for a festival? **[2]**

c. A laddu costs Abdul Rs 20 to make, and he marks it 30% above this. What percent of discount can he give and still make a profit of 17%? **[2]**

Question 4 — 5 marks

Prakriti in Dharan is learning how her phone stores things.

a. A computer stores the number 110101_2. Convert it into the decimal number system. **[1]**

b. Her phone can store 1.2×10^{11} bytes, and one photo takes 3×10^6 bytes. How many such photos can it store? Give the answer in scientific notation. **[2]**

c. Her phone sends 12 photos in 9 seconds. At the same rate, how long does it take to send 20 photos? **[1]**

d. Her calculator shows $\pi = 3.141592654$, and her friend says, "The decimal stops, and we also write $\pi = \frac{22}{7}$, so π is a rational number." Is her friend right? Give a reason. **[1]**

Question 5 — 5 marks

For Dashain, Aayush in Tansen makes a paper kite $ABCD$ in the shape shown. Its diagonals cross at right angles at P, with $AP = 20$ cm, $PC = 36$ cm and $BP = PD = 15$ cm. (Take $\pi = \frac{22}{7}$.)

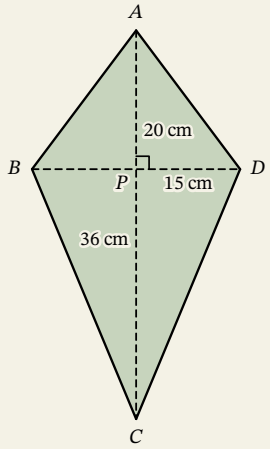


Figure 2 The kite.

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

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

c. He pastes a round picture of diameter 21 cm in the middle of the kite. What area of the kite is not covered by the picture? **[2]**

d. He wants to run a thread once round the edge of the kite, and he has 120 cm of it. Is it enough? Give a reason. **[1]**

Question 6 — 3 marks

a. Write x^{-m} with a positive index. **[1]**

b. Reduce to the lowest terms: $\frac{x^2 - 16}{x^2 + 4x}$ **[2]**

Question 7 — 3 marks

A science club in Jumla has x boys and y girls, so that $x + y = 9$ and $x - y = 3$.

a. When two such equations are drawn on a graph, what does the point where the lines cross give? **[1]**

b. Solve the equations by using a graph, and write how many boys and girls are in the club. **[2]**

Question 8 — 4 marks

a. Find the lowest common multiple (LCM) of $2x^2 - 8$ and $x^2 + 3x + 2$. **[2]**

b. Manoj opens a book at two facing pages. Their numbers are consecutive natural numbers, and their product is 506. Make a quadratic equation, and find the page numbers. **[2]**

Question 9 — 4 marks

In the figure, P is a ward office in Sindhuli and Q is a mobile tower. PN and QN_1 are the north lines, and they are parallel. The bearing of Q from P is 065°.

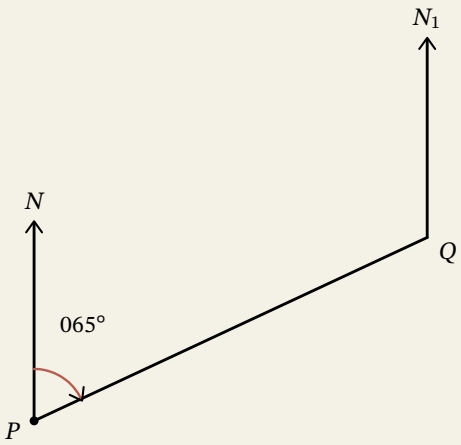


Figure 4 The north lines at P and Q.

a. PQ is a transversal of the north lines. What is the name of the pair of angles $\angle NPQ$ and $\angle N_1QP$? **[1]**

b. Find $\angle N_1QP$, and then the bearing of P from Q. **[2]**

c. Sagar, who works at the ward office, cuts the shape below from card to make a box in the shape of a cube. He says, "It has six equal squares, so it will fold into a cube." Is he right? Give a reason. **[1]**

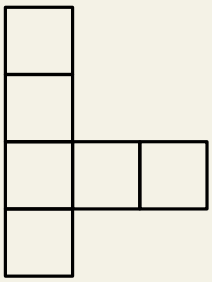


Figure 5 Sagar's shape of six squares.

Question 10 — 5 marks

a. Construct a square $ABCD$ of side 5.5 cm. **[3]**

b. M is the midpoint of BC and N is the midpoint of CD. Join AM and AN. Prove that $\triangle ABM \cong \triangle ADN$. **[2]**

Question 11 — 6 marks

a. Which regular polygon makes the tessellation named 4.4.4.4? **[1]**

Answer the following questions on the basis of the given figure.

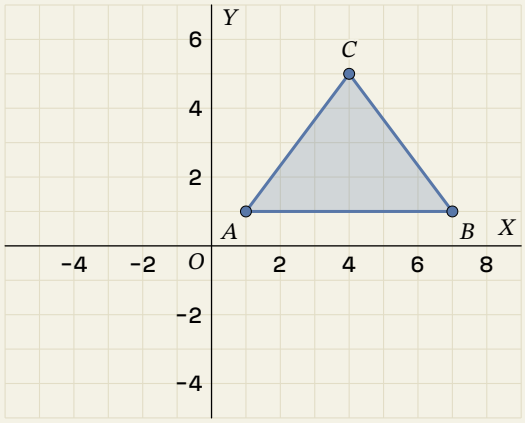


Figure 8 $\triangle ABC$ **on a grid.**

b. Translate $\triangle ABC$ 5 units left and 4 units down. Write the coordinates of A', B' and C'. **[2]**

c. Find the lengths of the sides of $\triangle ABC$, and write what type of triangle it is by its sides. **[3]**

Question 12 — 3 marks

Selina runs a homestay at Rara Lake in Mugu. The number of visitors to the lake on eight days was:

42, 35, 56, 35, 48, 60, 39, 45

a. Find the mode of the data. **[1]**

b. Find the median of the data. **[2]**