Grade 8 Math Model Paper 4

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, a ruler and a compass for Question 10, and a compass and a protractor for Question 12.

Question 1 — 3 marks

Sampada travels by the town buses in Dharan. On the town's bus map the stops have the numbers 1 to 8. In the Venn diagram, U is the set of these stops, R is the set of stops on the red route and G is the set of stops on the green route.

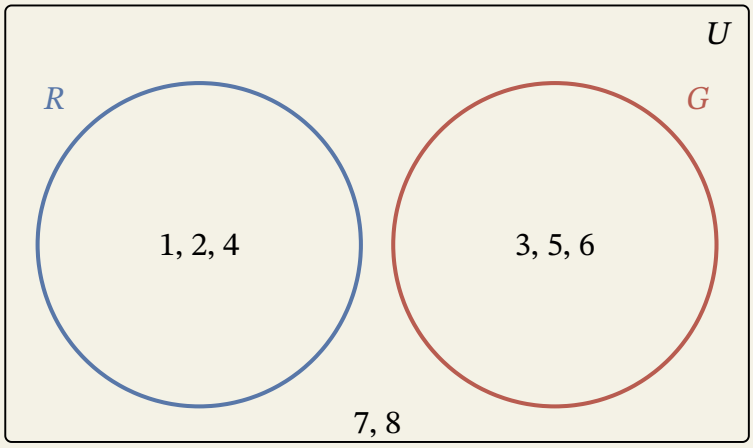


Figure 1 The stops on the two routes.

a. What are disjoint sets? **[1]**

b. Write the set of stops that are on neither route. **[1]**

c. Sampada is at stop 2 and wants to go to stop 5. Can she do it by changing from one route to the other at a stop, without walking? Give a reason. **[1]**

Question 2 — 4 marks

Rojina has saved Rs 80,000 from her job in Dhangadhi. She deposits it in a bank at 7% simple interest a year.

a. What is the amount of a deposit made up of? **[1]**

b. How much interest does her deposit earn in one year? **[1]**

c. She leaves the money in the bank for 3 years, and 5% of the interest is taken as income tax. How much does she receive at the end? **[2]**

Question 3 — 5 marks

Sanjeev grows apples at Marpha in Mustang.

a. When are four numbers a, b, c and d in proportion? **[1]**

b. A truck carries his apples in 40 crates of 30 kg each. How many crates of 24 kg would make up the same load? **[2]**

c. He needs a new sprayer. A shop in Pokhara marks one at Rs 9,600 and gives a 15% discount. A shop in Butwal marks the same sprayer at Rs 10,500 and gives a 25% discount, but it charges Rs 400 for sending it. Which shop should he buy from? Give a reason. **[2]**

Question 4 — 5 marks

Suman's science club in Damauli is building a model of the solar system.

a. The club's cupboard at school has the number 38. Write 38 in the quinary number system. **[1]**

b. Light travels 3×10^8 m in a second, and sunlight takes 5×10^2 seconds to reach the Earth. Find the distance from the Sun to the Earth in scientific notation. **[2]**

c. The diameters of the model's Sun and Earth are in the ratio $109{:}1$. If the model Sun is 218 cm across, how wide is the model Earth? **[1]**

d. A poster in the club's room shows the number $0.1010010001\ldots$, with one more zero each time. Suman says, "It has only the digits 0 and 1, again and again, so it is a rational number." Is he right? Give a reason. **[1]**

Question 5 — 5 marks

Shruti has a terrace field $ABCD$ in Kaski, in the shape of a trapezium, as in the figure. $AB \parallel DC$, $AB = 30$ m, $DC = 18$ m and the field is 16 m wide along AD, which is at right angles to AB.

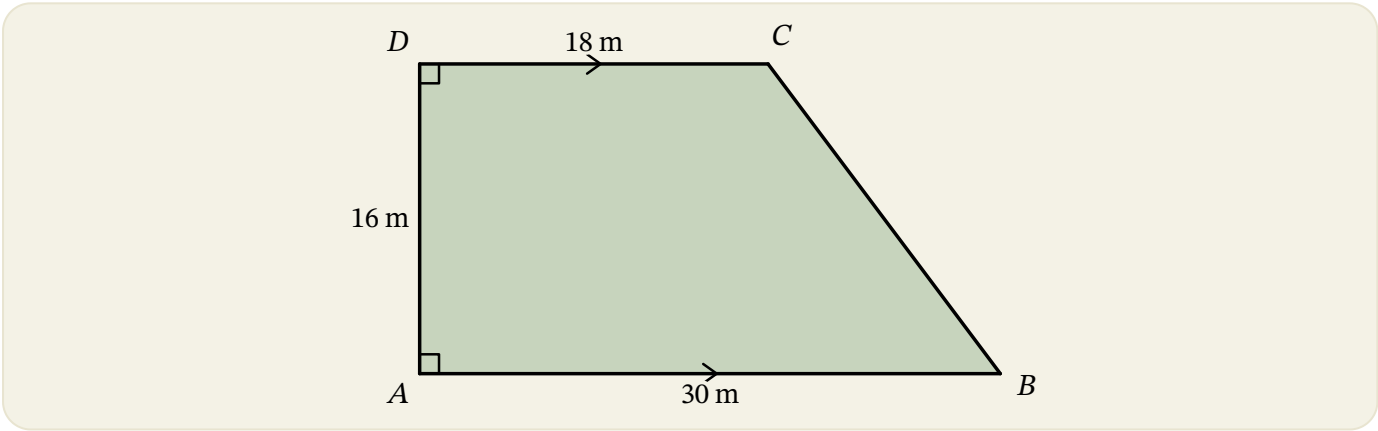


Figure 2 Shruti's field.

a. Write the formula to find the area of a trapezium with parallel sides a and b and height h. **[1]**

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

c. Find the length of BC, and the distance once round the field. **[2]**

d. One bag of mustard seed is enough for 100 m², and Shruti has 3 bags. Can she sow the whole field? Give a reason. **[1]**

Question 6 — 3 marks

a. Write the value of x^0, where $x \neq 0$. **[1]**

b. Simplify: $\dfrac{2}{x+1} + \dfrac{3}{x-1}$ **[2]**

Question 7 — 3 marks

Two equations are given below.

$x + 2y = 8$ **and** $x - y = 2$

a. What is a pair of equations like these called? **[1]**

b. Solve the equations by using a graph. **[2]**

Question 8 — 4 marks

a. Factorize: $9x^2 - 24x + 16$ **[2]**

b. Suraj's square courtyard in Janakpur has an area of $(4x^2 + 20x + 25)$ m². When $x = 5$, will a rope 55 m long go once round it? Give a reason. **[2]**

Question 9 — 4 marks

Milan is planning a trek in Myagdi. His map has a coordinate grid on it, and north is straight up.

a. On the map's grid, camp P is at (x_1, y_1) and camp Q is at (x_2, y_2). Write the formula to find the distance PQ. **[1]**

b. The bearing of Q from P is 130°, and on the map PQ is 3.5 cm. If the scale of the map is 1 cm = 2 km, find the bearing of P from Q and the real distance between the camps. **[2]**

c. On the map, two straight trails AB and CD are crossed by a stream EF as in the figure. Milan says, "The trails are parallel, so they will never meet." Is he right? Give a reason. **[1]**

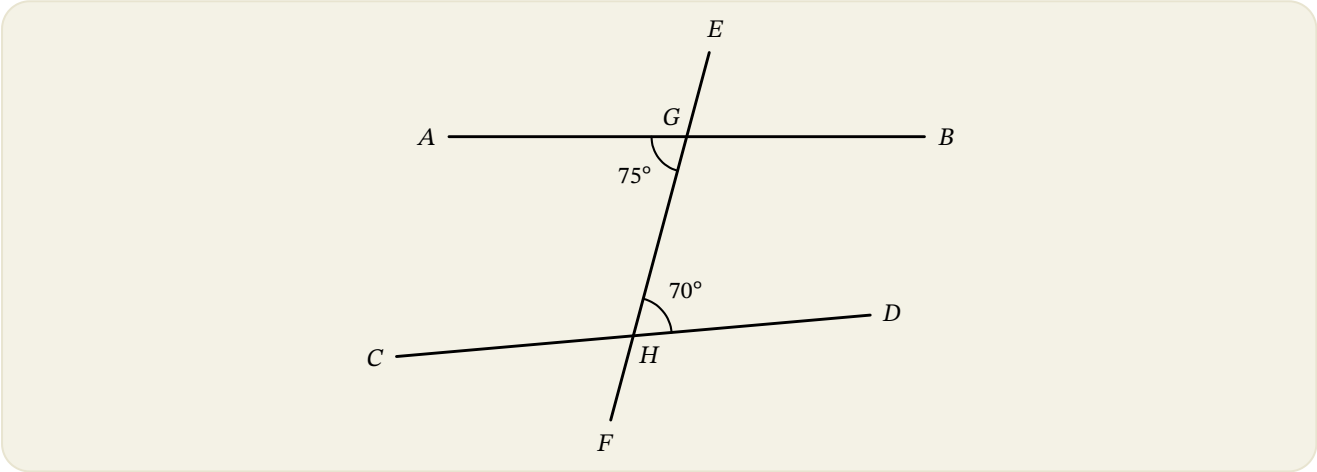


Figure 4 $\angle AGH = 75^\circ$ and $\angle DHG = 70^\circ$.

Question 10 — 5 marks

a. Construct a parallelogram $ABCD$ with $AB = 6$ cm, $AD = 4.5$ cm and $\angle DAB = 60^\circ$. **[3]**

b. Draw the diagonal BD. Prove that $\triangle ABD \cong \triangle CDB$. **[2]**

Question 11 — 6 marks

Prarthana has a tile shop in Thimi. The figure shows a floor she has laid in the shop, of squares and regular octagons.

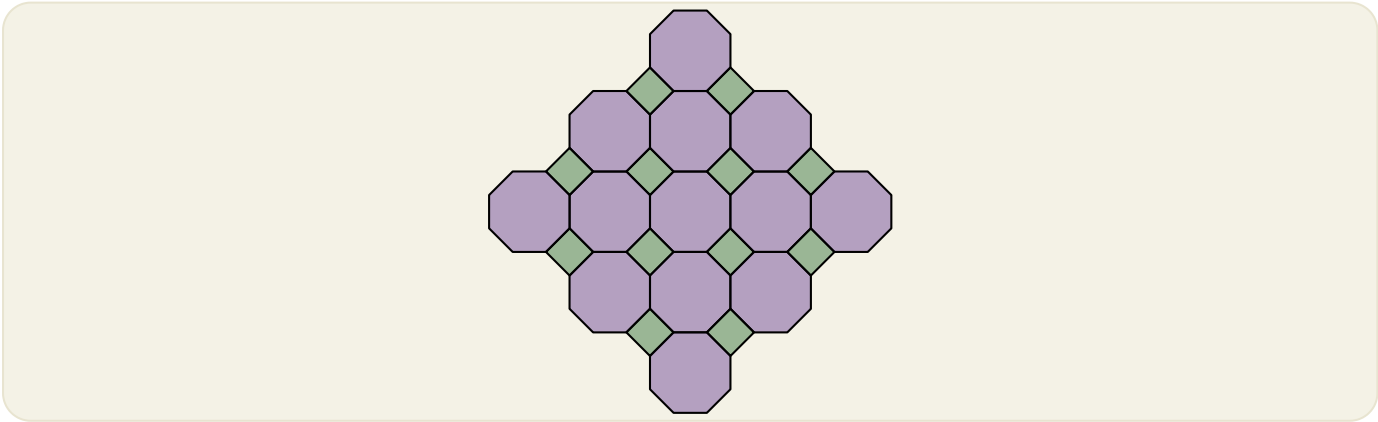


Figure 7 Part of the floor.

a. The skylight over the floor has the shape of a square pyramid. How many vertices does a square pyramid have? **[1]**

b. Write the tessellation number of this floor, and show that the angles at one corner add up to $360\circ$. **[2]**

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

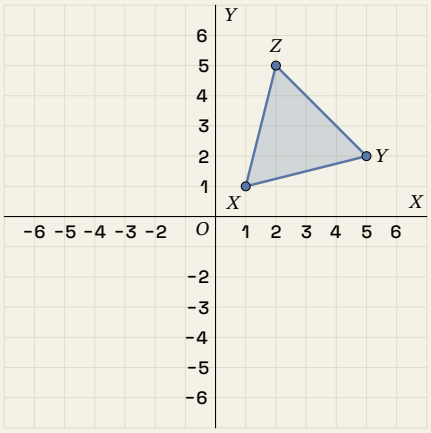


Figure 8 $\triangle XYZ$ **on a grid.**

c. Rotate $\triangle XYZ$ about the origin through $180\circ$. Draw the image on the same graph, and write the coordinates of X', Y' and Z'. **[3]**

Question 12 — 3 marks

Anil's family in Biratnagar earns Rs 40,000 a month and spends all of it like this.

Food	Rent	Education	Other things
40%	25%	20%	15%

a. How much does the family spend on education in a month? **[1]**

b. Present the family's spending in a pie chart. **[2]**