Grade 8 Math Model Paper 6

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 protractor for Question 10.

Question 1 — 3 marks

Aishwarya's science club in Gorkha sorts the eight planets for a wall chart. In the Venn diagram, U is the set of the planets, R is the set of rocky planets and M is the set of planets with moons. The planets are shortened to Me (Mercury), V (Venus), E (Earth), Ma (Mars), J (Jupiter), S (Saturn), Ur (Uranus) and N (Neptune).

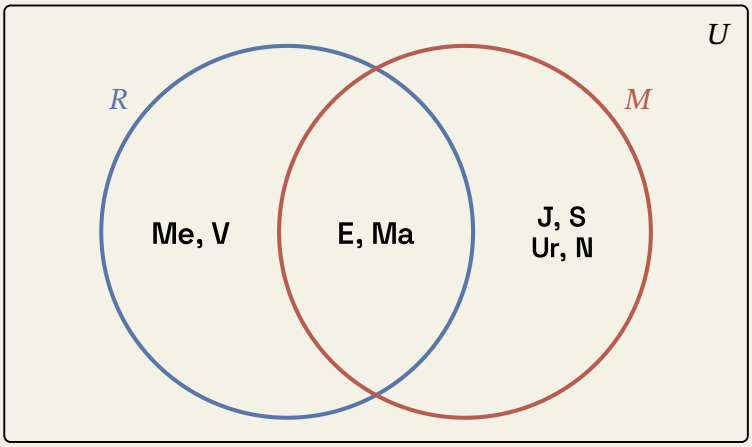


Figure 1 The planets on the wall chart.

a. Write "Earth is an element of R" with a symbol. **[1]**

b. Write the set of rocky planets with moons. **[1]**

c. A friend of Aishwarya's says, "$R \subset M$, because a rocky planet like ours has a moon." Is the friend right? Give a reason. **[1]**

Question 2 — 4 marks

Amrit and two friends run a small coffee farm in Gulmi.

a. What is a ratio? **[1]**

b. A coffee plant on the farm is 1.5 m tall, and a young one beside it is 75 cm tall. Find the ratio of their heights in its lowest terms. **[1]**

c. The three friends share a profit of Rs 63,000 in the ratio $2:3:4$. How much does each get? **[2]**

Question 3 — 5 marks

Saurav is a vegetable farmer in Palpa, and he goes to a bank and a cooperative for loans.

a. A bank charges Rs 9 a year on every Rs 100 of a loan. Write this rate of interest as a percent. **[1]**

b. On a loan of Rs 60,000, Saurav paid Rs 12,000 in interest in 2 years 6 months. Find the rate of interest. **[2]**

c. Now he needs Rs 30,000 for 2 years. The bank asks 12% a year. The cooperative asks 10% a year and a fee of Rs 1,000 at the start. Which loan costs him less? Give a reason. **[2]**

Question 4 — 5 marks

Aayusha sells plastic water tanks in Butwal.

a. A tank of 2,000 liters is marked Rs 18,500. What does a customer pay at a discount of 20%? **[1]**

b. A drop of water is about 5×10^{-5} liters. About how many drops fill the tank of 2×10^{3} liters? Give the answer in scientific notation. **[2]**

c. The maker's label on the tank gives its batch as 1011101_2. Write this number in the decimal number system. **[1]**

d. 4 taps fill the tank in 6 hours. A customer wants it filled in 5 hours at most. Will 5 taps of the same kind do it? Give a reason. **[1]**

Question 5 — 5 marks

For Tihar, Radhika in Ilam sews a string of flags for her lane. Each flag is an isosceles triangle with equal sides of 25 cm and a base of 30 cm.

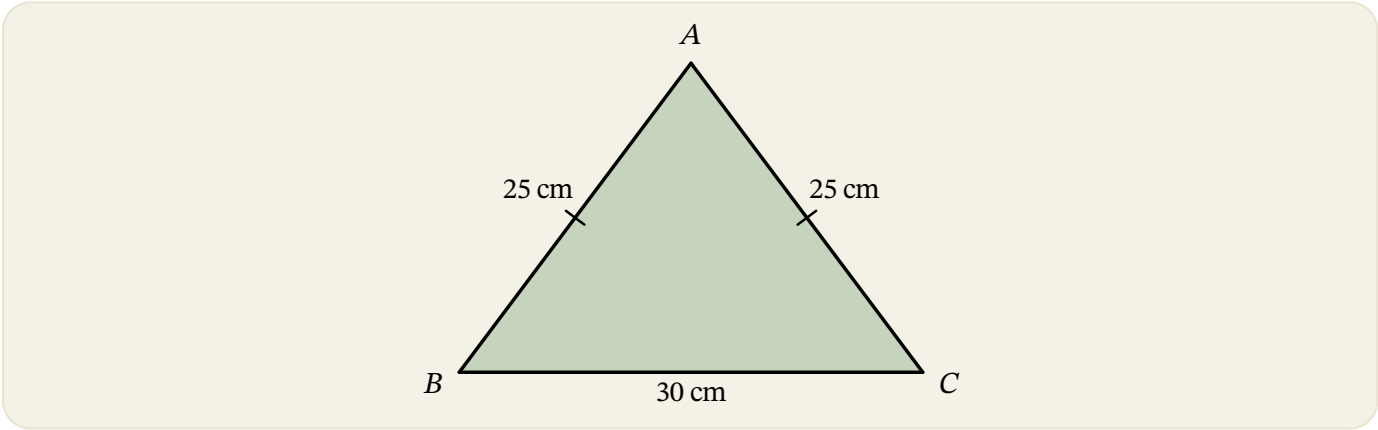


Figure 2 One flag.

a. Write the formula to find the area of an isosceles triangle with equal sides a and base b. **[1]**

b. Find the area of one flag. **[1]**

c. She makes 40 flags. If the cloth costs Rs 150 a square meter, what is the cost of the cloth in the flags? **[2]**

d. She wants to hang the 40 flags on a string 10 m long, with their bases side by side. Will they all fit? Give a reason. **[1]**

Question 6 — 3 marks

a. Write $(xy)^n$ without the brackets. **[1]**

b. Simplify: $\dfrac{x^2 - 4}{x + 3} \div \dfrac{x - 2}{x^2 - 9}$ **[2]**

Question 7 — 3 marks

Two equations are given below.

$x + y = 1$ **and** $x - y = 5$

a. How many solutions do two such equations have if their lines cross? **[1]**

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

Question 8 — 4 marks

a. Find the lowest common multiple (LCM) of $x^2 - 1$ and $x^2 + x$. **[2]**

b. Sujan, a mason in Birtamod, stacks bricks in rows: 1 brick in the top row, 2 in the next, 3 in the next, and so on. n complete rows use $\frac{n(n+1)}{2}$ bricks. Can he use exactly 66 bricks in complete rows? Give a reason. **[2]**

Question 9 — 4 marks

Rachana's ward in Bandipur is building a small pavilion. Its floor is a regular polygon, and its roof comes to a point like a pyramid.

a. A roof like this is a solid object with flat faces. For such a solid, write the relation between the number of faces F, vertices V and edges E. **[1]**

b. Each exterior angle of the floor is 40°. Find the number of sides of the floor and the size of each interior angle. **[2]**

c. On a plan of the site, where 1 unit is 1 m, the pavilion is at $W(2,\ 3)$, a tap is at $A(-1,\ 7)$ and a well is at $B(8,\ 3)$. Rachana says the tap is nearer the pavilion than the well. Is she right? Give a reason. **[1]**

Question 10 — 5 marks

Tenzing leads a walk in Solukhumbu. From camp A he walks 8 km on a bearing of 060° to a bridge B, and then 6 km on a bearing of 150° to a village C.

a. Make a scale drawing of the walk, with the scale 1 cm = 1 km. From your drawing, find the distance from A straight to C. **[3]**

b. In the village, a pole 2 m tall has a shadow 3 m long, and at the same time a tower has a shadow 27 m long. Tenzing has a rope of 20 m. Will it reach from the top of the tower to the ground? Give a reason. **[2]**

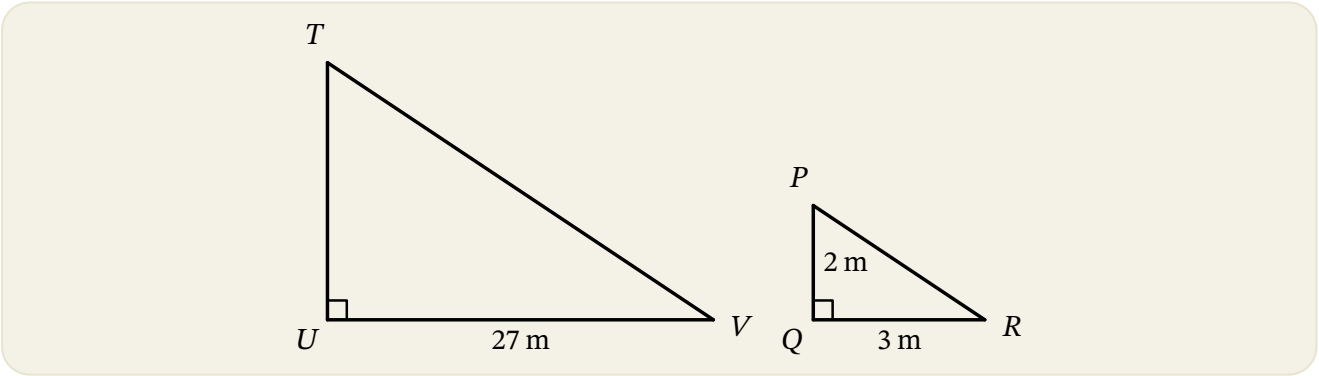


Figure 5 The tower TU and its shadow UV, and the pole PQ and its shadow QR (not drawn to one scale).

Question 11 — 6 marks

Richa lays a courtyard in Dhulikhel with the pattern in the figure, of regular hexagons, squares and equilateral triangles.

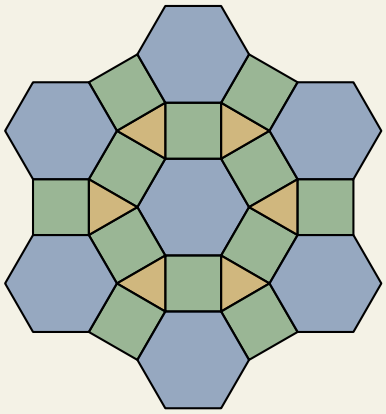


Figure 6 Part of the courtyard.

a. Two straight edges of the courtyard are crossed by a third. What are the angles between the two edges, on opposite sides of the third, called? **[1]**

b. Write the tessellation number of Richa's pattern, and say whether it is regular or semi-regular. **[2]**

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

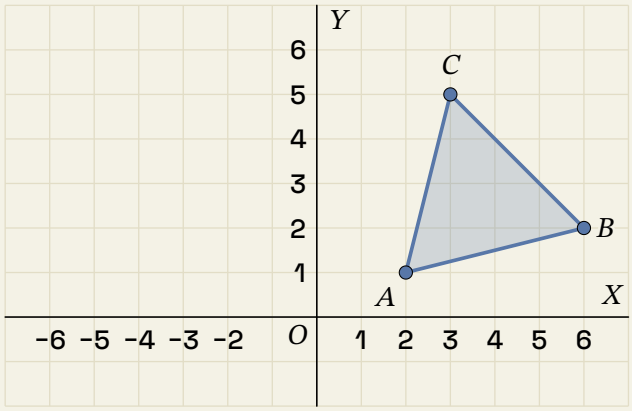


Figure 7 $\triangle ABC$ on a grid.

c. Rotate $\triangle ABC$ about the origin through $+90^\circ$. Draw the image on the same graph, and write the coordinates of A', B' and C'. **[3]**

Question 12 — 3 marks

Aadarsh has a tea stall in Bhairahawa. His sales on six days, one of them a fair day, were:

Rs 900, Rs 1,100, Rs 1,000, Rs 1,200, Rs 800, Rs 7,000

a. Find the mean of his daily sales. **[1]**

b. Find the median of his daily sales. Which of the mean and the median tells you better what an ordinary day is like? **[2]**