CLASS 8 · MATHEMATICS

# Proportional Reasoning-2

## Sample paper · 15 questions · 22 marks

10 objective questions × 1 mark. Five written-response questions: 12 marks. Write your working where needed. Suggested time: 45 minutes. Answers and marking guidance follow the questions.

Original Evater practice material aligned with these school topics. Not an official NCERT paper or marking scheme. No automatic grading is implied.

## Section A · Objective questions (10 marks)

1. A map has the scale ratio 1 : 1,00,000. Two places are 3 cm apart on the map. Their actual distance apart is:

A. 3 km

B. 300 m

C. 300 km

D. 30 km

2. Rs 600 is divided between two friends in the ratio 2 : 3. The smaller share is:

A. Rs 240

B. Rs 200

C. Rs 300

D. Rs 360

3. A concrete mix uses cement, sand and gravel in the ratio 1 : 2 : 3. In 60 kg of mix, the amount of sand is:

A. 20 kg

B. 30 kg

C. 40 kg

D. 10 kg

4. In a class of 40 students, 10 travel to school on foot. In a pie chart of travel modes, the angle of the 'on foot' slice is:

A. 40 deg

B. 100 deg

C. 90 deg

D. 10 deg

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5. The angles of all the slices of a pie chart always add up to:

A. 270 deg

B. 180 deg

C. 100 deg

D. 360 deg

6. 6 workers take 8 days to build a wall. Working at the same rate, 12 workers would take:

A. 2 days

B. 4 days

C. 8 days

D. 16 days

7. x and y are in inverse proportion. When x = 4, y = 18. When x = 6, y equals:

A. 9

B. 24

C. 27

D. 12

8. A train covers a fixed distance. If its speed is doubled, the time taken becomes:

A. Four times

B. Double

C. Half

D. Unchanged

9. Which pair of quantities is in inverse proportion?

A. Number of notebooks bought and their total cost

B. A child's age and height

C. Distance walked and time at a fixed speed

D. Number of equally productive workers and time for a divisible fixed job

10. A drink mixes water and syrup in the ratio 4 : 1. What percentage of the drink is syrup?

A. 20%

B. 40%

C. 10%

D. 25%

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# Section B · Written responses (12 marks)

Attempt all five. Use a separate sheet if you need more space. The marks for each question are shown.

11. A map uses the scale 1 : 2,50,000. Two towns are 8 cm apart on the map. Find their actual distance apart in kilometres. [2 marks]

12. Divide Rs 1800 among three children in the ratio 2 : 3 : 4. Show each share. [2 marks]

13. Explain the difference between direct proportion and inverse proportion, giving one everyday example of each. [2 marks]

14. A family spends its monthly budget of Rs 9000 as follows: food 50%, rent 30%, savings 20%. Find the pie-chart angle and the amount for each head. [3 marks]

15. 4 identical pipes together fill a tank in 9 hours. How long would 6 such pipes take? How many pipes are needed to fill the tank in 3 hours? Assume all pipes fill at the same rate. [3 marks]

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# Answers & marking guidance

Use these after attempting the paper. Accept equivalent correct reasoning and sensible units. These are Evater model answers, not an official marking scheme.

## Section A · 1 mark each

1. A — 3 cm on the map means 3,00,000 cm in reality, and 3,00,000 cm = 3 km.

2. A — Total parts = 5; one part = Rs 120, so the smaller share is 2 x 120 = Rs 240.

3. A — Total parts = 6; one part = 10 kg, so sand = 2 x 10 = 20 kg.

4. C — 10 out of 40 is one quarter of the class, and one quarter of 360 deg is 90 deg.

5. D — A pie chart is a full circle, so its slices total 360 degrees.

6. B — Workers and days are in inverse proportion: 6 x 8 = 12 x days, so days = 4.

7. D — The product stays constant: 4 x 18 = 72, so y = 72 / 6 = 12.

8. C — For a fixed distance, speed and time are inversely proportional, so doubling the speed halves the time.

9. D — Assuming equal constant work rates and a job that can be shared without delays, workers multiplied by time is constant.

10. A — Syrup is 1 part out of 5, and 1/5 x 100 = 20%.

## Section B · Model answers

11. Actual distance = 8 x 2,50,000 = 20,00,000 cm. Converting: 20,00,000 cm = 20,000 m = 20 km.

Marking: 1 mark for multiplying by the scale; 1 mark for the correct conversion to 20 km.

12. Total parts = 2 + 3 + 4 = 9. One part = 1800 / 9 = Rs 200. The shares are 2 x 200 = Rs 400, 3 x 200 = Rs 600 and 4 x 200 = Rs 800, which add back to Rs 1800.

Marking: 1 mark for one part = Rs 200; 1 mark for all three correct shares.

13. In direct proportion, both quantities grow together and their ratio is constant, for example the number of pens bought and the total cost. In inverse proportion, one quantity grows as the other shrinks and their product is constant, for example the speed of a car and the time for a fixed journey.

Marking: 1 mark for a correct statement of each type (constant ratio vs constant product); 1 mark for two sensible examples.

14. Angles: food = 50% of 360 deg = 180 deg, rent = 30% of 360 deg = 108 deg, savings = 20% of 360 deg = 72 deg. Amounts: food = Rs 4500, rent = Rs 2700, savings = Rs 1800.

Marking: 1 mark for the three angles; 1 mark for the three amounts; 1 mark for correct method linking percentage of the circle to percentage of the budget.

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15. Pipes and time are in inverse proportion, and 4 x 9 = 36 pipe-hours fill the tank. With 6 pipes, time = 36 / 6 = 6 hours. For 3 hours, pipes needed = 36 / 3 = 12.

Marking: 1 mark for identifying inverse proportion (36 pipe-hours); 1 mark for 6 hours; 1 mark for 12 pipes.

## Topic references

NCERT Class 8 Mathematics, Ganita Prakash, Chapter 10: Proportional Reasoning-2.

https://ncert.nic.in/textbook/pdf/hegp203.pdf

Concept reference only. Questions and model answers are original Evater practice material, not an official NCERT paper.

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