

Mathematics Practice Test — Class VIII*Chapters: Power Play & Proportional Reasoning (with Diagram/Graph-Based Questions)*

Name: _____ Section: _____

Time Allowed: 90 minutes**Maximum Marks: 50****General Instructions:**

1. All questions are compulsory unless stated otherwise.
2. Section A carries 1 mark each, Section B carries 2 marks each, Section C carries 3 marks each, and Section D carries 4-5 marks each.
3. Read all graphs and diagrams carefully before answering; show all necessary steps/working for full credit.
4. Use of calculators is not permitted.

SECTION A — Multiple Choice Questions (1 mark each — 8 questions = 8 marks)**Q1.** The value of $2^4 \times 2^3$ is: [1]

- (a) 2^7
- (b) 2^{12}
- (c) 4^7
- (d) 8^4

Q2. In standard form, 0.0000456 is written as: [1]

- (a) 4.56×10^5
- (b) 4.56×10^{-5}
- (c) 45.6×10^{-6}
- (d) 4.56×10^{-6}

Q3. The value of $(-5)^0$ is: [1]

- (a) 0
- (b) 1
- (c) -5
- (d) -25

Q4. Simplify: $3^{-2} \times 3^5$ [1]

- (a) 3^3
- (b) 3^7
- (c) 3^{-3}
- (d) 3^{10}

Q5. Refer to the bar chart below, which shows a bacteria culture doubling every hour. [1]

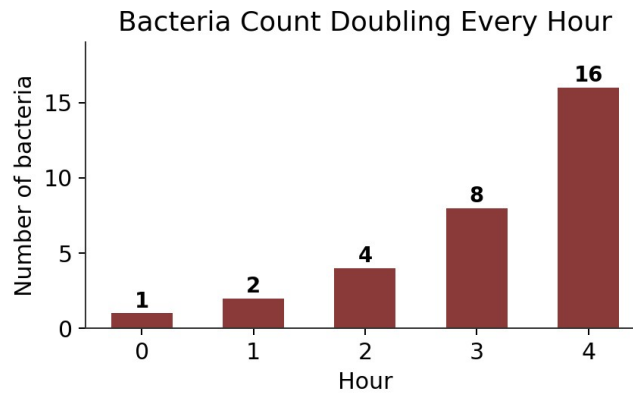


Fig. 1: Bacteria count doubling every hour

Q5 (contd.). Following the same pattern, how many bacteria will there be at Hour 7?

- (a) 49
- (b) 64
- (c) 128
- (d) 256

Q6. If the cost of 5 notebooks is ₹175, the cost of 8 notebooks (using direct proportion) is: [1]

- (a) ₹245
- (b) ₹280
- (c) ₹256
- (d) ₹210

Q7. The ratio 45 : 60 in its simplest form is: [1]

- (a) 3 : 4
- (b) 4 : 3
- (c) 9 : 12
- (d) 15 : 20

Q8. $(2^3)^2$ is equal to: [1]

- (a) 2^5
- (b) 2^6
- (c) 2^8
- (d) 2^9

SECTION B — Short Answer Questions (2 marks each — 6 questions = 12 marks)

Q9. Simplify and write in exponential form as well as fractional form: $(-3)^4 \times (-3)^{-7}$ [2]

Q10. Express 384,000,000 in standard form. [2]

Q11. Find the value of x if $5^x \div 5^3 = 5^5$. [2]

Q12. The ratio of the number of boys to girls in a class is 5 : 4. If there are 36 girls, find the number of boys. [2]

Q13. The graph below shows the distance covered by a vehicle moving at constant speed. [2]

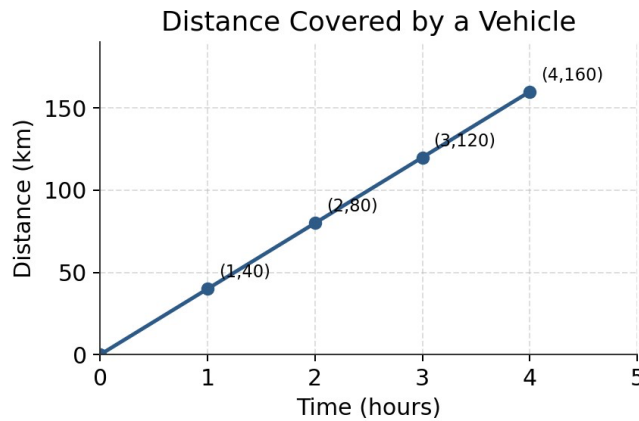


Fig. 2: Distance-Time graph of a vehicle

Q13 (contd.). Using the graph, find the speed of the vehicle in km/h.

Q14. If a is inversely proportional to b , and $a = 8$ when $b = 3$, find a when $b = 12$. [2]

SECTION C — Application-Based Questions (3 marks each — 5 questions = 15 marks)

Q15. Simplify the expression, giving the answer in exponential form:

$$(2^3 \times 3^2) \times (2^4 \times 3^5) \div (2^2 \times 3^3) \quad [3]$$

Q16. The distance between the Sun and the Earth is about 1.496×10^8 km, and the distance between the Sun and Mars is about 2.279×10^8 km. Find how much farther Mars is from the Sun than Earth is, giving your answer in standard form. [3]

Q17. The pie chart below shows the favourite sport of 40 students of Class VIII. [3]

Favourite Sport of 40 Students in Class VIII

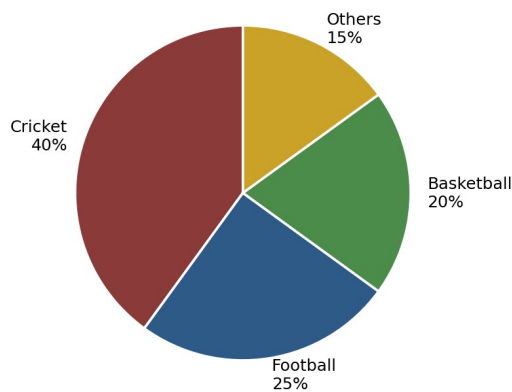


Fig. 3: Favourite sport of 40 students

Q17 (contd.). (a) Find the number of students who prefer Cricket.

(b) Write the ratio of students who prefer Cricket : Football : Basketball in simplest form.

Q18. The diagram below shows a water tank with 5 identical taps that together fill the tank in 12 hours. [3]

5 identical taps fill the tank in 12 hours

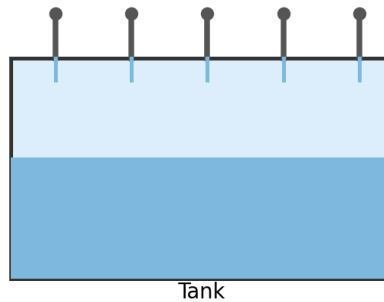


Fig. 4: Tank with 5 identical taps

Q18 (contd.). If only 3 of these taps are opened, how long will they take to fill the same tank? (Assume all taps work at the same rate.)

Q19. A map is drawn to a scale of 1 : 250000. Two towns are 6.5 cm apart on the map. What is the actual distance between them in kilometres? [3]

SECTION D — Long Answer / HOTS Questions (5 marks each — 3 questions = 15 marks)

Q20. (a) Simplify using laws of exponents: $[(4^2)^3 \times 4^{-5}] \div 4^3$

(b) If $2^{x+1} \times 2^{x-1} = 2^8$, find the value of x. Show your working for both parts. [5]

Q21. The graph below plots the number of workers against the number of days taken to complete the same job. [5]

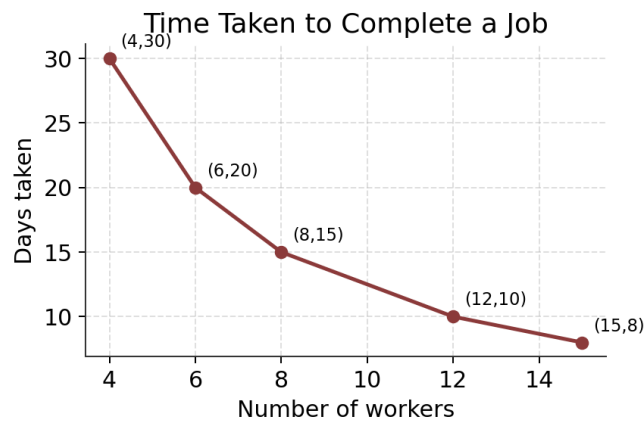


Fig. 5: Workers vs Days taken to complete a job

Q21 (contd.). (a) Is this graph an example of direct or inverse proportion? Give one reason based on the shape of the graph.

(b) Using the graph/pattern, find the constant of proportionality (i.e., workers $\times$ days).

(c) If 10 workers are employed on this job, how many days will it take, assuming the same pattern continues?

Q22. The mass of the Earth is approximately 5.97×10^{24} kg and the mass of the Moon is approximately 7.35×10^{22} kg.

(a) Express the ratio of the mass of the Earth to the mass of the Moon in the form a : 1 (rounded to the nearest whole number).

(b) If the combined mass of Earth and Moon were expressed in standard form, what would it be (approximately)? [5]

ANSWER KEY**SECTION A — MCQ Answers** (1 mark each)

1. (a) 2^7 2. (b) 4.56×10^{-5} 3. (b) 1 4. (a) 3^3
 5. (c) 128 [pattern: count = 2^n , so Hour 7 = $2^7 = 128$]
 6. (b) ₹280 7. (a) 3 : 4 8. (b) 2^6

SECTION B — Short Answers (2 marks each)

9. $(-3)^4 \times (-3)^{-7} = (-3)^{4-7} = (-3)^{-3}$ — Exponential form: $(-3)^{-3}$ Fractional form: $-1/27$
 10. $384,000,000 = 3.84 \times 10^8$
 11. $5^{x-3} = 5^5 \Rightarrow x - 3 = 5 \Rightarrow x = 8$
 12. Boys : Girls = 5 : 4. Girls = 36 $\Rightarrow$ 1 part = 9 $\Rightarrow$ Boys = $5 \times 9 = 45$
 13. From the graph, at $t = 2$ h, $d = 80$ km $\Rightarrow$ Speed = $80/2 = 40$ km/h
 14. $a \times b = \text{constant} = 8 \times 3 = 24$. When $b = 12$, $a = 24/12 = 2$

SECTION C — Application-Based Answers (3 marks each)

15. Numerator: $2^7 \times 3^7$. Divide by $2^2 \times 3^3 \Rightarrow 2^5 \times 3^4$
 16. $2.279 \times 10^8 - 1.496 \times 10^8 = 0.783 \times 10^8 = 7.83 \times 10^7$ km
 17. (a) 40% of 40 = 16 students (b) Cricket:Football:Basketball = 40:25:20 = 8:5:4
 18. 5 taps $\rightarrow$ 12 hours, so 1 tap $\rightarrow$ 60 hours (5×12). With 3 taps: $60/3 = 20$ hours
 19. 1 cm on map = 250000 cm actual. 6.5 cm = $6.5 \times 250000 = 1,625,000$ cm = 16.25 km

SECTION D — Long Answer / HOTS Answers (5 marks each)

20. (a) $4^6 \times 4^{-5} \div 4^3 = 4^1 \div 4^3 = 4^{-2} = 1/16$ (b) $2^{x+1+x-1} = 2^{2x} = 2^8 \Rightarrow 2x = 8 \Rightarrow x = 4$
 21. (a) Inverse proportion — the graph is a curve that falls as workers increase, not a straight line through the origin.
 (b) Constant = workers $\times$ days = $4 \times 30 = 120$ (check: $6 \times 20 = 120$, $8 \times 15 = 120$ ✓) (c) days = $120/10 = 12$ days
 22. (a) Ratio = $5.97 \times 10^{24} / 7.35 \times 10^{22} = (5.97/7.35) \times 10^2 \approx 0.812 \times 100 \approx 81$, so ratio $\approx 81 : 1$ (b) Combined mass $\approx 5.97 \times 10^{24} + 0.0735 \times 10^{24} \approx 6.0435 \times 10^{24}$ kg $\approx 6.04 \times 10^{24}$ kg

— End of Test —