



Attempt questions first; check the separate key afterward. Show all working. Draw accurate figures where required.

A. Very short answers - 1 mark each

1. Find 17^2 .
2. Find 13^3 .
3. Is 2025 a perfect square?
4. Is 1728 a perfect cube?
5. Find $\sqrt{1296}$ by prime factorisation.
6. Find $\sqrt[3]{3375}$ by prime factorisation.
7. Find the smallest multiplier making 180 a perfect square.
8. Find the smallest multiplier making 72 a perfect cube.

B. Short answers / practice - 2 marks each

9. Find the smallest divisor making 540 a perfect square.
10. Find the smallest divisor making 864 a perfect cube.
11. How many unit squares form a 24 by 24 square?
12. How many unit cubes form a cube of side 8 units?
13. Find the least square divisible by 6, 8 and 15.
14. Find the least cube divisible by 3 and 5.
15. Between which consecutive integers does $\sqrt{70}$ lie?
16. Between which consecutive integers does $\sqrt[3]{100}$ lie?
17. Explain why a square cannot end in 2.
18. List possible unit digits of perfect squares.
19. Find the square root of 0.0081.
20. Find the cube root of 0.000216.

C. Application / reasoning - 3 marks each

21. A square field has area 1764 m^2 . Find its perimeter.
22. A cube has volume 2744 cm^3 . Find its edge.
23. Find the sum of the first 15 odd natural numbers.
24. Use an identity to calculate 99^2 .
25. Find the smallest number to add to 1000 to obtain a square.
26. Find the smallest number to subtract from 1000 to obtain a square.
27. Find the least square greater than 2000.
28. Find $\sqrt[3]{-4096}$.
29. Find the units digit of 37^2 .
30. A square garden has perimeter 100 m. Find its area.
31. Find the least multiplier making 250 a perfect cube.

D. Extended practice - 5 marks per pair

32. Find a Pythagorean triple containing 12 as an even leg.
33. Can a perfect cube be negative? Give an example.
34. Explain the prime-exponent tests for perfect squares and cubes.
35. Find the least positive integer that is both a square and cube and exceeds 1.

ANSWER KEY - Numerical / closed questions

- 1) 289. 2) 2197. 3) Yes; 45^2 . 4) Yes; 12^3 . 5) 36.
6) 15. 7) 5. 8) 3. 9) 15. 10) 4. 11) 576. 12) 512.
13) 3600. 14) 3375. 15) 8 and 9. 16) 4 and 5.
17) 0, 1, 4, 5, 6, 9. 18) 0.09. 19) 0.06. 20) 0.06.
21) 168 m. 22) 14 cm. 23) 225. 24) 9801. 25) 24.
26) 39. 27) 2025. 28) -16. 29) 9. 30) 625 m^2 .
31) 4. 32) 12, 35, 37. 33) Yes; $-8 = (-2)^3$. 34) 64.