Unit 2 · Whole Number

HARDER PRACTICE QUESTIONS

Full marks 36

Write your answers on separate paper. Show your working, one step a line. Find square roots by prime factors or by the division method, and cube roots by prime factors, as the unit does.

1 Spot the errors [3]

Ankit wrote these three answers. Each is wrong. Find the right answer, and say what went wrong.

i. $\sqrt{10609} = 13$

ii. $\sqrt[3]{64000} = 400$

iii. The HCF of 12 and 18 is 36.

2 Only one is a square [4]

Exactly one of these numbers is a square number: 4,358, 5,329, 6,410, 7,227.

i. Rule out three of them by their last digits alone. Give the reason for each.

ii. Find the square root of the fourth by the division method.

3 An orchard in a square [4]

A farmer in Dhankuta plants 3,136 orange saplings in a square: the same number in every row and every column, 2 m apart each way.

i. How many saplings are there in each row? Use prime factors.

ii. A fence goes round the outside. How many saplings are in the outermost ring, next to the fence?

iii. How long is one side of the square of saplings, from the first sapling in a row to the last?

4 A painted cube [4]

Sanskriti glues 5,832 small wooden cubes into one big cube, then paints the whole outside of the big cube red.

i. How many small cubes are there along each edge? Use prime factors.

ii. How many small cubes have no paint on them at all?

iii. How many small cubes have some paint?

5 A square and a cube at once [4]

$72 = 2 \times 2 \times 2 \times 3 \times 3$.

i. By what smallest number must 72 be multiplied to make a square number? Which square is it?

ii. By what smallest number must 72 be multiplied to make a cube number? Which cube is it?

iii. By what smallest number must 72 be multiplied to make a number that is a square **and** a cube? Show that your answer is both.

6 Tiles for a hall [4]

The floor of a school hall is a rectangle 1,140 cm long and 840 cm wide. It is to be covered with square tiles, all the same size, with no tile cut.

i. What is the biggest tile that can be used? Find it by the division method.

ii. How many of these tiles are needed?

iii. Could tiles 30 cm on a side be used? How many then?

7 Three buses [3]

From a bus park in Kathmandu, a bus to Banepa leaves every 12 minutes, one to Dhulikhel every 18 minutes and one to Panauti every 30 minutes. All three leave together at 6:00 in the morning. (The times are made up.)

i. After how long do all three next leave together?
ii. How many times do all three leave together from 6:00 in the morning to 12 noon, both included?
iii. Do all three leave together at 10:30? Give a reason.

8 HCF or LCM? [3]

Say whether each needs the HCF or the LCM, then answer it.

a. Two ribbons, 84 cm and 126 cm long, are cut into pieces all of the same length, as long as possible, with nothing left over. How long is each piece?
b. Laddoos are to be packed in boxes of 12 or boxes of 15 with none left over. What is the smallest number of laddoos that works both ways?
c. A class has between 100 and 200 students. They can stand in rows of 8, of 10 or of 12 with no one left over. How many students are there?

9 Make your own [3]

Write a three-digit square number whose three digits are all different and whose square root is a prime number. Show by prime factors that it is a square, and give its root. Then write a second one.

10 Think: HCF 4, LCM 48 [4]

Two different numbers have an HCF of 4 and an LCM of 48.

i. Explain why each number must be a factor of 48 and a multiple of 4.
ii. List the factors of 48 that are multiples of 4.
iii. Find every pair of numbers that works.
iv. Which pair has the smaller sum?