Unit 11 · Indices

HARDER PRACTICE QUESTIONS

Full marks 30

Write your answers on separate paper. Show your working.

1 Spot the errors [3]

Sadikshya wrote three answers. Correct each one, and say what she did wrong.

i. $2^5 = 10$

ii. $3^2 \times 3^3 = 9^5$

iii. $4^3 = 3^4$

2 Which is bigger? [3]

Work out each, and say which is bigger, or whether they are equal.

i. 2^{10} and 10^2

ii. 3^4 and 4^3

iii. 2^6, 4^3 and 8^2

3 The missing index [4]

Find the number that goes in each box.

i. $2^{\square} = 64$

ii. $5^{\square} = 125$

iii. $3^{\square} \times 3^2 = 3^7$

iv. $x^4 \times x^{\square} \times x = x^9$

4 News that spreads [3]

On Sunday Ujwal tells 3 friends some news. On Monday each of them tells 3 new friends, on Tuesday each of those tells 3 more, and so on.

i. How many people hear the news on Tuesday? Write it in index form, then work it out.

ii. How many hear it on Thursday?

iii. On which day do more than 500 new people hear it for the first time?

5 Ropani, aana, paisa, daam [3]

1 ropani = 16 aana, 1 aana = 4 paisa and 1 paisa = 4 daam.

i. Write the number of daam in 1 ropani as a power of 4.

ii. How many daam are there in 1 aana? Write it as a power of 4 too.

iii. A plot is 1 ropani 5 aana 3 paisa. How many paisa is that?

6 Count the factors [3]

Work out, and write each answer in index form.

i. $2^3 \times 2^4 \times 2$

ii. $a^2\, b \times a\, b^3$

iii. $2x^2 \times 5x \times x^3$

7 Both a square and a cube [4]

64 is a square number, 8^2, and a cube number, 4^3.

i. Write the square numbers from 2^2 to 10^2, and the cube numbers from 2^3 to 5^3.
ii. Which number appears in both lists?
iii. Write 64 as a power of 2.
iv. The next number after 64 that is both a square and a cube is a power of 3. Find it, and write it as a square and as a cube.

8 Make your own [3]

Write a short story in which something is multiplied by the same number again and again, so that the answer to its question is 2^6. Then work out the answer.

9 Think: the last digit [4]

i. Work out 3^1, 3^2, 3^3, ..., 3^8, and write down the last digit of each.
ii. What pattern do the last digits make?
iii. Without working it out, find the last digit of 3^{20}.
iv. Find the last digit of 3^{25}.