Unit 3 Section 1 : Index Notation

Here we revise the use of index notation. You will already be familiar with the notation for squares and cubes

$$a^2 = a \times a$$
$$a^3 = a \times a \times a$$

this is generalised by defining:

$$a^n = \underbrace{a \times a \times \ldots \times a}_{n \text{ of these}}$$

Example 1

Calculate the value of:

(a) 5^2 Show me...

(b) 2^5 Show me...

(c) 3^3 Show me...

(d) 10^4 Show me...

Example 2

Fill in the missing number or numbers:

(a) $2\square = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$ Show me...

(b) $9 = 3\square$ Show me...

(c) $1000 = 10\square$ Show me...

(d) $5^3 = \square \times \square \times \square$ Show me...

Example 3

(a) Determine 2^5. Show me...

(b) Determine 2^3. Show me...

(c) Determine $2^5 \div 2^3$. Show me...

(d) Express your answer to (c) in index notation. Show me...

Exercises

Work out the answers to the questions below and fill in the boxes. Click on the Check button to find out whether you have answered correctly. If you are right then ✔ Correct will appear and you should move on to the next question. If ✘ Try again appears then your answer is wrong. Click on ✘ Try again to clear your original answer and have another go. If you can't work out the right answer then click on Tell me ! to see the answer.

Question 1
Calculate:

(a) 2^3 8 ✔ Correct

(b) 10^2 100 ✔ Correct

(c) 3^2 9 ✔ Correct

(d) 10^3 1000 ✔ Correct

(e) 9^2 81 ✔ Correct

(f) 3^3 27 ✔ Correct

(g) 2^4 16 ✔ Correct

(h) 3^4 81 ✔ Correct

(i) 7^2 49 ✔ Correct

Question 2
Fill in the missing numbers:

(a) $10 \times 10 \times 10 \times 10 \times 10 = 10^{5}$ ✔ Correct

(b) $3 \times 3 \times 3 \times 3 = 3^{4}$ ✔ Correct

(c) $7 \times 7 \times 7 \times 7 \times 7 = 7^{5}$ ✔ Correct

(d) $8 \times 8 \times 8 \times 8 \times 8 = 8^{5}$ ✔ Correct

(e) $5 \times 5 = 5^{2}$ ✔ Correct

(f) $19 \times 19 \times 19 \times 19 = 19^{4}$ ✔ Correct

(g) $6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6 = 6^{7}$ ✔ Correct

(h) $11 \times 11 \times 11 \times 11 \times 11 \times 11 = 11^{6}$ ✔ Correct

Question 3
Fill in the missing numbers:

(a) $8 = 2^{3}$ ✓ Correct

(b) $81 = 3^{4}$ ✓ Correct

(c) $100 = 10^{2}$ ✓ Correct

(d) $81 = 9^{2}$ ✓ Correct

(e) $125 = 5^{3}$ ✓ Correct

(f) $1\,000\,000 = 10^{6}$ ✓ Correct

(g) $216 = 6^{3}$ ✓ Correct

(h) $625 = 5^{4}$ ✓ Correct

Question 4

Is 10^{2} bigger than 2^{10} ?

No , because 10^{2} = 100 and 2^{10} = 1024 ✓ Correct

Question 5

Is 3^{4} bigger than 4^{3} ?

Yes , because 3^{4} = 81 and 4^{3} = 64 ✓ Correct

Question 6

Is 5^{2} bigger than 2^{5} ?

No , because 5^{2} = 25 and 2^{5} = 32 ✓ Correct

Question 7

Fill in the missing numbers:

(a) $49 = 7^{2}$ ✓ Correct

(b) $64 = 4^{3}$ ✓ Correct

(c) $64 = 2^{6}$ ✓ Correct

(d) $64 = 8^{2}$ ✓ Correct

(e) $100\,000 = 10^{5}$ ✓ Correct

(f) $243 = 3^{5}$ ✓ Correct

Question 8

Calculate:

(a) $2^{2} + 2^{3}$ 12 ✓ Correct

(b) $2^2 \times 2^3$ 32 ✓ Correct

(c) $3^2 + 2^2$ 13 ✓ Correct

(d) $3^2 \times 2^2$ 36 ✓ Correct

(e) $2^3 \times 10^3$ 8000 ✓ Correct

(f) $10^3 + 2^5$ 1032 ✓ Correct

Question 9
Calculate:

(a) $(3 + 2)^4$ 625 ✓ Correct

(b) $(3 - 2)^4$ 1 ✓ Correct

(c) $(7 - 4)^3$ 27 ✓ Correct

(d) $(7 + 4)^3$ 1331 ✓ Correct

Question 10
Writing your answers in index form, calculate:

(a) $10^2 \times 10^3$ 10 5 ✓ Correct

(b) $2^3 \times 2^7$ 2 10 ✓ Correct

(c) $3^4 \div 3^2$ 3 2 ✓ Correct

(d) $2^5 \div 2^2$ 2 3 ✓ Correct

(e) $10^6 \div 10^2$ 10 4 ✓ Correct

(f) $5^4 \div 5^2$ 5 2 ✓ Correct

Question 11

(a) Without using a calculator, write down the values of k and m.

$64 = 8^2 = 4^k = 2^m$
k = 3
m = 6 ✓ Correct

(b) Complete the following:

$2^{15} = 32\ 768$
2^{14} = 16384 ✓ Correct

You have now completed Unit 3 Section 1

Your overall score for this section is 100%

Correct Answers

You answered 52 questions correctly out of the 52 questions in this section.

Incorrect Answers

There were 0 questions where you used the *Tell Me* button.

There were 0 questions with wrong answers.

There were 0 questions you didn't attempt.

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