N5

Powers, roots and primes

Introduction

When you use the internet to pay for goods you need to know that your financial details are safe. To make these details secure they are turned into a secret code (encrypted). The message can be encrypted using the product of two very large prime numbers – the person receiving the message has to know both of these prime numbers so that they can decrypt the message.

What's the point?

The problems involved in identifying very large prime numbers make it very difficult for someone intercepting an encrypted message to crack the code.

Orientation

What I need to know	What I will learn	What this leads to
N1, N2	▫ Recognise and use squares and cubes, and corresponding roots ▫ Multiply and divide by powers of 10 ▫ Recognise prime numbers and use divisibility tests ▫ Understand and use the terms factor and multiple ▫ Find the highest common factor and least common multiple	+3

Check in

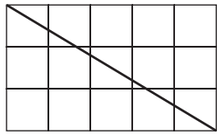
1 Calculate
a 7×7 **b** $2 \times 2 \times 2$
c $10 \times 10 \times 10$ **d** $32 \div 100$

2 Find the missing number in this calculation.
$\_\_\_ \times \_\_\_ = 25$

3 Does 244 divide by 4?
Explain how you know.

Rich task

This diagram shows a 5 by 3 rectangular grid of squares.



The main diagonal of the rectangle passes through seven of the squares.

What is the connection between the length and width of the rectangle and the number of squares crossed by the main diagonal?

N5.1 Squares and cubes

This spread will show you how to:
- Use square and cube numbers
- Use the square and cube functions of a calculator

Keywords
Cube
Index
Power
Square

- A **square** number is the result of multiplying a **whole** number by itself.

1st square number	2nd square number	3rd square number	4th square number
1	4	9	16
$1 \times 1 = 1^2$	$2 \times 2 = 2^2$	$3 \times 3 = 3^2$	$4 \times 4 = 4^2$

Square numbers can be written using **index** notation.

$5^2 = 5 \times 5 = 25$ $\quad 12^2 = 12 \times 12 = 144$

Use the x^2 function key on a calculator to find the square of a number.

To find 34^2, type [3] [4] [x^2] [=] The display should read 1156.

You can say 5^2 in lots of different ways

5^2 = '5 to the **power** of 2'
= '5 squared'
= 'the square of 5'

- A **cube** number is the result of multiplying a whole number by itself and then multiplying by that number again.

Cube numbers can be represented using 3-D drawings of cubes.

1st cube number	2nd cube number	3rd cube number	4th cube number
1	8	27	64
$1 \times 1 \times 1 = 1^3$	$2 \times 2 \times 2 = 2^3$	$3 \times 3 \times 3 = 3^3$	$4 \times 4 \times 4 = 4^3$

Cube numbers can be written using index notation.

$4^3 = 4 \times 4 \times 4 = 64$ $\quad 14^3 = 14 \times 14 \times 14 = 2744$

Use the x^3 function key on a calculator to find the cube of a number.

To find 19^3, you would type [1] [9] [x^3] [=] The display should read 6859.

You can say 4^3 in lots of different ways:

4^3 = '4 to the power of 3'
= '4 cubed'
= 'the cube of 4'

Exercise N5.1 — Grade E

1 Find these numbers.
a the 4th square number
b the 8th square number
c the 20th square number
d the 5th cube number
e the 7th cube number
f the 10th cube number

2 Use your calculator to work out each of these squares and cubes.
a 6^2 **b** 11^2 **c** 14^2 **d** 23^2
e 31^2 **f** 47^2 **g** 4^3 **h** 6^3
i 8^3 **j** 13^3 **k** 18^3 **l** 21^3

You will not be allowed to use a calculator in your Paper 1 assessment.

Problem AO3

3 Some numbers can be represented as the sum of two square numbers.
For example $1^2 + 2^2 = 1 + 4 = 5$.
Try to find all the numbers less than 50 that can be represented as the sum of two square numbers.

4 Use your calculator to work out each of these.
a $3^2 + 2^2$ **b** $5^2 - 3^2$ **c** $6^2 - 2^3$
d $4^3 + 4^2$ **e** $10^2 - 8^2$ **f** $13^2 + 4^3$
g $14^2 - 5^3$ **h** $6^3 - 13^2$ **i** $12^2 + 13^2 + 14^2$
j $6^3 + 7^3 + 8^3$

5 Use the x^2 and x^3 function keys on your calculator to work out each of these. Give your answer to two decimal places as appropriate.
a 2.5^2 **b** 49^2 **c** 3.2^3 **d** 4.8^2
e 7.3^2 **f** 4.9^3 **g** 1.2^2 **h** 0.5^2
i 9.9^2 **j** 9.9^3 **k** $(5\text{ cm})^2$ **l** $(4\text{ m})^3$

Problem AO3

6 **a** Work out these.
$3^2 - 2^2 =$ __ $\quad 4^2 - 3^2 =$ __ $\quad 5^2 - 4^2 =$ __
b Write anything you have noticed about your answers.
c Copy and complete this table and investigate for the next seven pairs of consecutive integers.

Square number	Square number		Answer
3^2	2^2	$3^2 - 2^2 = 9 -$ __	
4^2	3^2	$4^2 - 3^2 = 16 -$ __	
5^2			
6^2			

Consecutive means 'next to', for example 4 and 5

N5.2 Square roots and cube roots

This spread will show you how to:

- Estimate and use square roots and cube roots
- Use the square root and cube root functions of a calculator

Keywords
Cube root
Square root

- A **square root** is a number that when multiplied by itself is equal to a given number.

$7 \times 7 = 49$ so you can say that the square root of $49 = 7$.

- Square roots are written using $\sqrt{\ }$ notation. $\sqrt{49} = 7$

You should try to learn the first 10 square numbers, then you will also know their square roots.

1st square number	$= 1 \times 1 = 1$	$\sqrt{1} = 1$
2nd square number	$= 2 \times 2 = 4$	$\sqrt{4} = 2$
3rd square number	$= 3 \times 3 = 9$	$\sqrt{9} = 3$

You can estimate the square root of a square number.

Example

289 is a square number. Work out $\sqrt{289}$ without using a calculator.

$15 \times 15 = 225$ This is too low, so $\sqrt{289}$ is greater than 15
$20 \times 20 = 400$ This is too high, so $\sqrt{289}$ is less than 20
$17 \times 17 = 289$ Correct
So $\sqrt{289} = 17$

You can use the grid method if you are stuck!

×	10	7
10	10 × 10 = 100	10 × 7 = 70
7	7 × 10 = 70	7 × 7 = 49

100
70
70
+ 49
289

Use the $\sqrt{x}$ function key on a calculator to find the square root of a number.

To find $\sqrt{289}$, you would type [$\sqrt{x}$] [2] [8] [9] [=] The display should read 17.

You will not be allowed to use a calculator in your Paper 1 assessment.

- A **cube root** is a number that when multiplied by itself and then multiplied by itself again is equal to a given number.

$2 \times 2 \times 2 = 8$ so the cube root of $8 = 2$ or $\sqrt[3]{8} = 2$

Use the $\sqrt[3]{x}$ function key on a calculator to find the cube root of a number.

To find $\sqrt[3]{1728}$, you would type [$\sqrt[3]{x}$] [1] [7] [2] [8] [=] The display should read 12.

Square roots and cube roots are often not whole numbers so you usually round your answer to two decimal places.

$\sqrt{300} = 17.320\,508\,08...$
$= 17.32$ (2 dp)

Exercise N5.2 Grade D

1 Find these numbers.
a $\sqrt{25}$ **b** $\sqrt{9}$ **c** $\sqrt{16}$ **d** $\sqrt{1}$ **e** $\sqrt{4}$

2 Calculate these using a calculator, giving your answer to 2 dp as appropriate.
a $\sqrt{40}$ **b** $\sqrt{61}$ **c** $\sqrt{180}$ **d** $\sqrt{249}$ **e** $\sqrt{676}$

3 Calculate these using the $\sqrt[3]{\ }$ key on your calculator. Give your answers to 2 dp where appropriate.
a $\sqrt[3]{27}$ **b** $\sqrt[3]{512}$ **c** $\sqrt[3]{3375}$ **d** $\sqrt[3]{100}$ **e** $\sqrt[3]{24\,389}$

Problem AO3

4 Harry has mixed up his answers to these questions.
a Without using a calculator, match each of these questions to the correct answer.

Questions	
1	$\sqrt{169}$
2	$\sqrt[3]{343}$
3	$\sqrt{121}$
4	$\sqrt{81}$
5	$\sqrt{64}$
6	$\sqrt[3]{1000}$
7	$\sqrt{196}$
8	$\sqrt[3]{64}$

Estimates	
A	9
B	8
C	7
D	4
E	11
F	13
G	10
H	14

b Check your answers using your calculator.
See how many of the questions and answers you matched correctly.

Functional Maths A02

5 **a** A square has an area of 144 m^2. What is the side length of the square?
b John thinks of a number. He multiplies the number by itself. The answer is 529. What number did John think of?
c Mr Mow designs a paddock. The paddock has to be in the shape of a square. The area of the paddock has to be 4000 m^2. What length should each of the sides of the paddock be? (Give your answer to the nearest metre.)
d Nelly digs a hole in the shape of a cube. The volume of the earth she digs out to make the hole is 64 000 cm^3. How deep is the hole?

6 Do not use a calculator for these questions.
a Between which two numbers does $\sqrt{95}$ lie?
b Between which two numbers does $\sqrt{150}$ lie?
c Between which two numbers does $\sqrt{300}$ lie?
d Between which two numbers does $\sqrt[3]{80}$ lie?

N5.3 Powers of 10

This spread will show you how to:
- Understand and use index notation
- Multiply and divide by powers of 10

Keywords
Index
Index notation
Power
Powers of 10

- **Index notation** is used to represent powers of any number.

  The **index** (or **power**) tells you how many times the number must be multiplied by itself.

  $7^4 = 7 \times 7 \times 7 \times 7 = 2401$

  $6^3 = 6 \times 6 \times 6 \quad = 216$

The small number is the index (or power).

Use your calculator to work out powers of a number.

To work out 13^5, you might type [1] [3] [y^x] [5] [=]

The display should read 371 293.

Your calculator may work differently. If you are unsure, ask your teacher or check your manual.

- The decimal system is based upon **powers of 10**.

1 ten	= 10	= 10	$= 10^1$
1 hundred	= 100	$= 10 \times 10$	$= 10^2$
1 thousand	= 1000	$= 10 \times 10 \times 10$	$= 10^3$
10 thousand	= 10 000	$= 10 \times 10 \times 10 \times 10$	$= 10^4$
100 thousand	= 100 000	$= 10 \times 10 \times 10 \times 10 \times 10$	$= 10^5$
1 million	= 1 000 000	$= 10 \times 10 \times 10 \times 10 \times 10 \times 10$	$= 10^6$

- It is easy to multiply and divide by **powers of 10**.

p.4

$\times 10^1 \Rightarrow$ digits move 1 place left
$\times 10^2 \Rightarrow$ digits move 2 places left

	Thousands	Hundreds	Tens	Units		tenths	hundredths
				3	•	2	
3.2×10^1			3	2	•		
3.2×10^2		3	2	0	•		

p.20

The '0' holds the digits in place so that the '3' digit is in the Hundreds column and the '2' digit is in the Tens column.

$\div 10^1 \Rightarrow$ digits move 1 place right
$\div 10^2 \Rightarrow$ digits move 2 places right

	Thousands	Hundreds	Tens	Units		tenths	hundredths
			4	5	•		
$4.5 \div 10^1$				4	•	5	
$4.5 \div 10^2$				0	•	4	5

Exercise N5.3 — Grade E

1 Find the value of
a 5^2 **b** 2^3 **c** 3^3 **d** 8^2 **e** 12^2

2 Find the value of
a 3^4 **b** 1^5 **c** 2^7 **d** 3^6 **e** 10^6

3 Use the y^x function key on your calculator to work out these.
a 12^3 **b** 6^6 **c** 21^3 **d** 16^5 **e** 13^3

4 Use your calculator to work out these powers. In each case copy the question and fill in the missing numbers.
a $3^? = 9$ **b** $5^? = 25$ **c** $4^? = 64$ **d** $2^? = 8$
e $24^? = 576$

Use a place value diagram.

5 Calculate each of these.
a 1.2×10 **b** $655 \div 10$ **c** 3.4×10^3
d $48 \div 100$ **e** 74×100 **f** $43.3 \div 10^2$

6 Here are some conversion rates for metric measurements.

1 km	=	1000 m	1 tonne	=	1000 kg
1 m	=	100 cm	1 kg	=	1000 g
1 cm	=	10 mm			

1 litre	= 1000 ml
$1\ m^3$	= 1000 litres

Change these lengths to the units indicated in brackets.
You will need to multiply and divide by powers of 10.

You will need to revise how to change between units to answer these questions.

a 30 mm	(centimetres)	**b** 7 cm	(millimetres)
c 3 km	(metres)	**d** 2500 m	(kilometres)
e 240 cm	(metres)	**f** 7.2 m	(centimetres)
g 2.4 tonnes	(kg)	**h** 3750 kg	(tonnes)
i 450 g	(kg)	**j** 2.04 kg	(grams)
k 330 ml	(litres)	**l** 4.54 litres	(ml)
m $15\ m^3$	(litres)	**n** 2300 litres	(m^3)

7 Copy these and fill in the missing numbers.
a $34 \div 10 =$ ___ **b** $2800 \div$ ___ $= 28$
c $6.1 \times$ __ $= 610$ **d** $5.7 \times 10^3 =$ ___

N5.4 Factors and multiples 1

This spread will show you how to:
- Understand the terms 'factor' and 'multiple'
- Find the common factors and common multiples of two numbers

Keywords
Common factor
Common multiple
Factor
Multiple
Product

Any number can be written as the product of two **factors**.

$20 = 2 \times 10$ so 2 and 10 are factors of 20.

- The factors of a number are those numbers that divide into it exactly, leaving no remainder.

You can often write a number as the **product** of two factors.

Product means multiply together.

24 can be written as 4×6 or 3×8 or 2×12 or 1×24.

The factor pairs are 1×24, 2×12, 3×8 and 4×6.

You can write the factors in a list: 1, 2, 3, 4, 6, 8, 12, 24.

- A **common factor** is a factor that is common to two different numbers.

p.250

Example

Write the common factors of 30 and 42.

The factors of 30 are 1 2 3 5 6 10 15 30

The factors of 42 are 1 2 3 6 7 14 21 42

The common factors of 30 and 42 are 1, 2, 3 and 6.

You can use factor pairs:
1×30
2×15
3×10
5×6

The first five **multiples** of 20 are 20, 40, 60, 80 and 100.

$1 \times 20 = 20$ $2 \times 20 = 40$ $3 \times 20 = 60$
$4 \times 20 = 80$ $5 \times 20 = 100$

- A **common multiple** is a multiple that is common to two different numbers.

Example

Write the first three common multiples of 8 and 12.

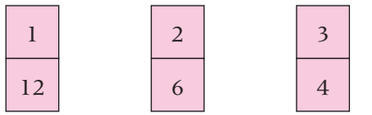
The multiples of 8 are 8 16 24 32 40 48 56 64 72 80 ...

The multiples of 12 are 12 24 36 48 60 72 84 ...

The first three common multiples of 8 and 12 are 24, 48 and 72.

Exercise N5.4 Grade E/F

1 This factor diagram shows all the factor pairs of 12.

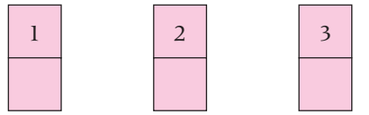


$1 \times 12 = 12$ $2 \times 6 = 12$ $3 \times 4 = 12$

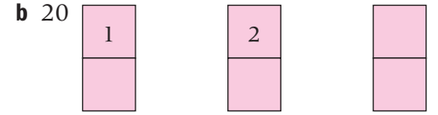
The factors of 12 are 1, 2, 3, 4, 6 and 12.

Copy and complete these factor diagrams.

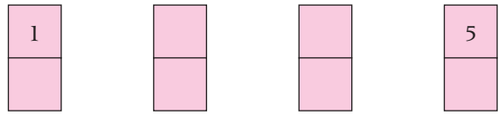
a 18



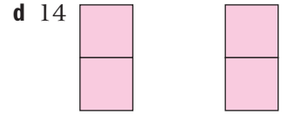
b 20



c 30



d 14



2 Draw factor diagrams for
a 15 **b** 22 **c** 28 **d** 36 **e** 40

3 Write all the factor pairs for each number.

a 8	**b** 16	**c** 23	**d** 34	**e** 10
f 26	**g** 42	**h** 48	**i** 39	**j** 44

4 Write the first three multiples of each number.

a 7	**b** 9	**c** 12	**d** 15	**e** 17
f 25	**g** 30	**h** 32	**i** 45	**j** 50

5 Find the common factors of

a 10 and 20	**b** 12 and 15	**c** 20 and 25
d 8 and 20	**e** 21 and 28	**f** 30 and 40
g 12 and 28	**h** 9 and 36	**i** 24 and 30

6 Find the first two common multiples of

a 6 and 10	**b** 9 and 12	**c** 4 and 6
d 10 and 15	**e** 14 and 21	**f** 20 and 30

Problem AO3

7 **a** Write a multiple of 20 that is bigger than 200.
b Write a multiple of 15 that is between 100 and 140.
c Write a multiple of 6 that is bigger than 70 but less than 100.

N5.5 Prime numbers

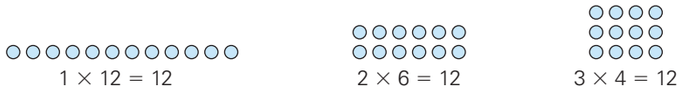
This spread will show you how to:

- Recognise prime numbers
- Use simple divisibility tests to check if a number is prime

Keywords
Factor
Prime number
Prime factor

Any whole number can be written as the product of two **factors**.

To list all the factors of 12, draw rectangles.



The factors of 12 are {1, 2, 3, 4, 6 and 12}.

1, 2, 3, 4, 6 and 12 are factors of 12 because all these numbers divide exactly into 12 with no remainder.

- A **prime number** is a number with only two factors, these are 1 and the number itself.

29 is a prime number because it has only two factors, the numbers 1 and 29.

The first ten prime numbers are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29.

- A **prime factor** is a prime number that is also a factor of another number.

Factors of 20 = {1, 2, 4, 5, 10, 20}
Prime factors of 20 = {2, 5}

This topic is extended to prime factor decomposition on page 412.

You can use simple divisibility tests to help you check if a number is a prime number.
Here are the divisibility tests for the first five prime numbers.

÷2	the number ends in 0, 2, 4, 6 or 8
÷3	the sum of the digits is divisible by 3
÷5	the number ends in 0 or 5
÷7	there is no check for divisibility by 7
÷11	the alternate digits add up to the same sum

Example

Which of the numbers in this list are prime numbers: 42, 27, 43, 55?

42 ⇒ 2 is a factor (because it ends in a 2)
42 is not a prime number.

27 ⇒ 2 is not a factor
3 is a factor (because 2 + 7 = 9, a multiple of 3)
27 is not a prime number.

43 ⇒ 2 is not a factor
3 is not a factor
5 is not a factor
7 is not a factor (because 6 × 7 is 42)
43 is a prime number.

55 ⇒ 2 is not a factor
3 is not a factor
5 is a factor (because it ends in a 5)
55 is not a prime number.

Exercise N5.5 — Grade E

1 Write all the factors of these numbers.

a 8 **b** 12 **c** 11 **d** 14
e 28 **f** 30 **g** 40 **h** 50

Problem AO3

2 Your task is to find all the prime numbers from 1 to 100.

a Copy this 1–100 number square.

b Follow these instructions.

- 1 is not a prime number so you can cross it out.
- 2 is the lowest prime number. Cross out all the multiples of 2 except for the number 2.
- 3 is the next number not crossed out. It is the next prime number. Cross out all the multiples of 3 except for the number 3.
- 5 is the next number not crossed out. It is the next prime number. Cross out all the multiples of 5 except for the number 5.

c Carry on until you have only prime numbers left.

d Make a list of all the prime numbers from 1 to 100.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

3 Use the divisibility tests to answer each of these questions.
In each case explain your answer.

a Is 5 a factor of 135? **b** Is 5 a factor of 210?
c Is 2 a factor of 321? **d** Is 11 a factor of 231?
e Is 7 a factor of 91?

4 Look at these numbers.

1 2 3 5 6 8 9
10 11 12 13 16 18 20

a Write all the numbers that are factors of 10.
b Write all the numbers that are square numbers.
c Write all the numbers that are prime factors of 44.
d Write all the numbers that are prime numbers.

5 Use the mental method of halving and doubling to calculate each of these. Show the method you have used.

a 4 × 21 **b** 3 × 16 **c** 23 × 4 **d** 16 × 15

6 Write all the prime factors of each of these numbers.

a 20 **b** 27 **c** 55 **d** 35
e 22 **f** 70 **g** 120 **h** 110

Hint for question 6: List all the factors. Find the ones that are prime.

DID YOU KNOW?

The largest prime number to date was discovered in 2008, and it is almost 13 million digits long. To find a prime number this big, you need a very large computer!

N5.6 Factors and multiples 2

This spread will show you how to:

- Understand and use the terms factor and multiple
- Understand and use simple divisibility tests
- Understand the terms highest common factor and least common multiple

Keywords
Common factor
Common multiple
Factor
HCF
LCM
Multiple

You can use a range of strategies to find all the **factors** of larger numbers.

Example

Find all the factors of 252.

You can list the factors by factor pairs.
Factors of 252 are

1×252	4×53	9×28
2×126	6×42	12×21
3×84	7×36	14×18

Factors of 252 are
{1, 2, 3, 4, 6, 7, 9, 12, 14, 18, 21, 28, 36, 42, 53, 84, 126, 252}.

You can use doubling and halving to help find factors:

$7 \times 36 = 252$
$14 \times 18 = 252$

p.246

You can find the **highest common factor (HCF)** of two numbers by listing all the factors of both numbers.

This topic is extended to prime factors on page 412.

Example

Find the HCF of 24 and 60.

The factors of 24 are: 1 2 3 4 6 8 12 24
The factors of 60 are: 1 2 3 4 5 6 10 12 15 20 30 60

1, 2, 3, 4, 6 and 12 are **common factors** of 24 and 60.
12 is the **highest common factor** of 24 and 60.

- The **multiples** of a number are those numbers that divide by it exactly, leaving no remainder.

The multiples of 18 are 18, 36, 54, 72, ...

$1 \times 18 = 18$ $3 \times 18 = 54$
$2 \times 18 = 36$ $4 \times 18 = 72$

You can think of multiples as being the numbers in the 'times tables'.

You can find the **least common multiple (LCM)** of two numbers by listing the first few multiples of each number.

Example

Find the least common multiple of 24 and 60.

The first six multiples of 24 are: 24 48 72 96 120 144
The first six multiples of 60 are: 60 120 180 240 300 360

120, 240, 360 are **common multiples** of 24 and 60.
120 is the **least common multiple** of 24 and 60.

Exercise N5.6 — Grade E

1 Write all the factor pairs of each of these numbers.
a 18 **b** 14 **c** 30 **d** 48

2 Look at these numbers.

2 3 4 5 6 8 10
12 15 16 17 18 19 20

a Write all the numbers that are factors of 40.
b Write all the numbers that are factors of 90.
c Write all the numbers that are multiples of 2.
d Write all the numbers that are prime numbers.

3 Write the first three multiples of each of these numbers.
a 6 **b** 11 **c** 19 **d** 25
e 65 **f** 105 **g** 187 **h** 308

4 Use divisibility tests to answer each of these questions.
In each case explain your answer.
a Is 5 a factor of 95? **b** Is 10 a factor of 710?
c Is 9 a factor of 321? **d** Is 11 a factor of 451?
e Is 6 a factor of 98?

5 Find the highest common factor of
a 6 and 4 **b** 12 and 18 **c** 14 and 16
d 28 and 35 **e** 30 and 54 **f** 56 and 64

6 Find the least common multiple of
a 6 and 4 **b** 6 and 8 **c** 12 and 18
d 15 and 25 **e** 21 and 28 **f** 26 and 39

Problem AO3

4 a Copy and complete this table.

Numbers	Product	HCF	LCM
6 and 4	$6 \times 4 = 24$	2	12
8 and 10	$8 \times 10 =$ ——		
12 and 18			
6 and 9			
15 and 20			
15 and 25			

b Write anything you notice about the numbers in your table.
c Write a quick way to find the LCM if you know the HCF.

N5

Summary

Check out

You should now be able to:

- Use the terms square, square root, cube and cube root
- Understand and use index notation for squares, cubes and powers of 10
- Multiply and divide by powers of 10
- Identify factors, multiples and prime numbers from a list of numbers
- Find the highest common factor and the least common multiple of two numbers

Worked exam question

Find the Least Common Multiple (LCM) of 24 and 36 (2)

(Edexcel Limited 2008)

Use multiplication sums to find the multiples of 24

24 1 × 24 = 24
24 2 × 24 = 48
24 3 × 24 = 72
24 4 × 24 = 96
24 5 × 24 = 120

Multiples of 24 are 24, 48, (72), 96, 120 .....

Write the first few multiples of 24

36 1 × 36 = 36
36 2 × 36 = 72

Multiples of 36 are 36, (72) .....

Write the multiples of 36

The Least Common Multiple is 72

Exam questions

1 Here is a list of numbers.

5 6 7 8 9 10

From the list of numbers write down

a an even number (1)
b a square number (1)
c a multiple of 4 (1)
d a factor of 14 (1)

2 Here is a list of numbers.

4 5 6 7 8 9 10 11 12

From the list write down

a two odd numbers, (1)
b a prime number (1)
c the highest common factor (HCF) of 32 and 40 (2)

3 **a** Work out the value of $4^2 + 2^5$ (2)
b Write down the cube root of 64 (1)

(Edexcel Limited 2006)

4 Use a calculator to work out

$$\sqrt{2.56} + 8.4$$ (2)

(Edexcel Limited 2008)

5 Find the Highest Common Factor (HCF) of 60 and 84 (2)

A02 + 3

6 Two airport towers flash at regular intervals.
One flashes every 12 seconds and the other flashes every 9 seconds.
An aircraft pilot sees both towers flashing at the same time.
How many seconds will pass before they both flash together again? (3)