Chhetri Academy

chhetriacademy.com

GCSE MATHS

Number

Edexcel 1MA1 | Subtopic collection Topic 02

Primes, factors, HCF and LCM

Higher tier

Past paper question booklet

49	2003-2025	Higher
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

2. (a) Express the following numbers as products of their prime factors.

Leave blank

(i) 60,

.....

(ii) 96.

.....

(4)

(b) Find the Highest Common Factor of 60 and 96.

.....

(1)

(c) Work out the Lowest Common Multiple of 60 and 96.

.....

(2)

Page Total

1. (a) Express 120 as the product of powers of its prime factors.

.....

(3)

(b) Find the Lowest Common Multiple of 120 and 150.

.....

(2)

18.

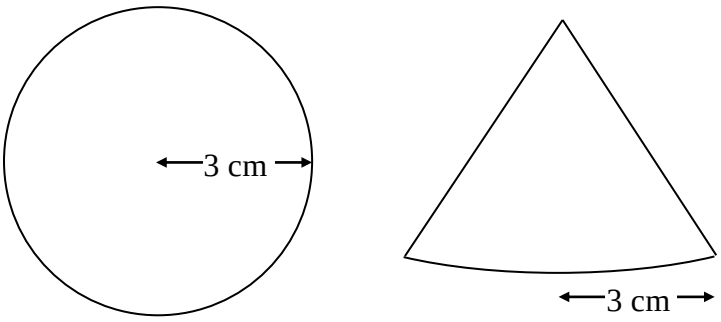


Diagram **NOT** accurately drawn

The radius of a sphere is 3 cm.
The radius of the base of a cone is also 3 cm.
The volume of the sphere is 3 times the volume of the cone.

Work out the curved surface area of the cone.
Give your answer as a multiple of π.

..... cm^2
(7)

1. (a) Use the information that

$$13 \times 17 = 221$$

to write down the value of

(i) 1.3×1.7

.....

(ii) $22.1 \div 1700$

.....

(2)

(b) Use the information that

$$13 \times 17 = 221$$

to find the Lowest Common Multiple (LCM) of 39 and 17

.....

(2)

4. (a) Express 108 as the product of powers of its prime factors.

.....

(3)

(b) Find the Highest Common Factor (HCF) of 108 and 24

.....

(1)

Do not write here

Blank

8. (a) Write 126 as a product of its prime factors.

.....

(2)

(b) Find the Highest Common Factor (HCF) of 84 and 126

.....

(2)

Q8

(Total 4 marks)

Blank

3. (a) Work out the Highest Common Factor (HCF) of 24 and 64

.....

(2)

(b) Work out the Lowest Common Multiple (LCM) of 24 and 64

.....

(2) **Q3**

(Total 4 marks)

8. $2x^2 = 72$

(a) Find a value of x.

.....

(2)

(b) Express 72 as a product of its prime factors.

.....

(2) **Q8**

(Total 4 marks)

11. Tarish says,

'The sum of two prime numbers is always an even number'.

He is **wrong**.
Explain why.

.....

.....

(Total 2 marks)

Q11

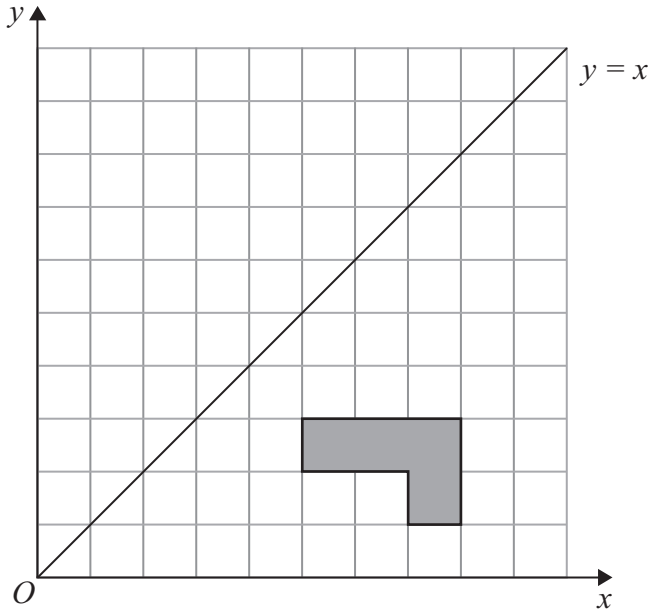
15. Express 180 as a product of its prime factors.

Q15

.....

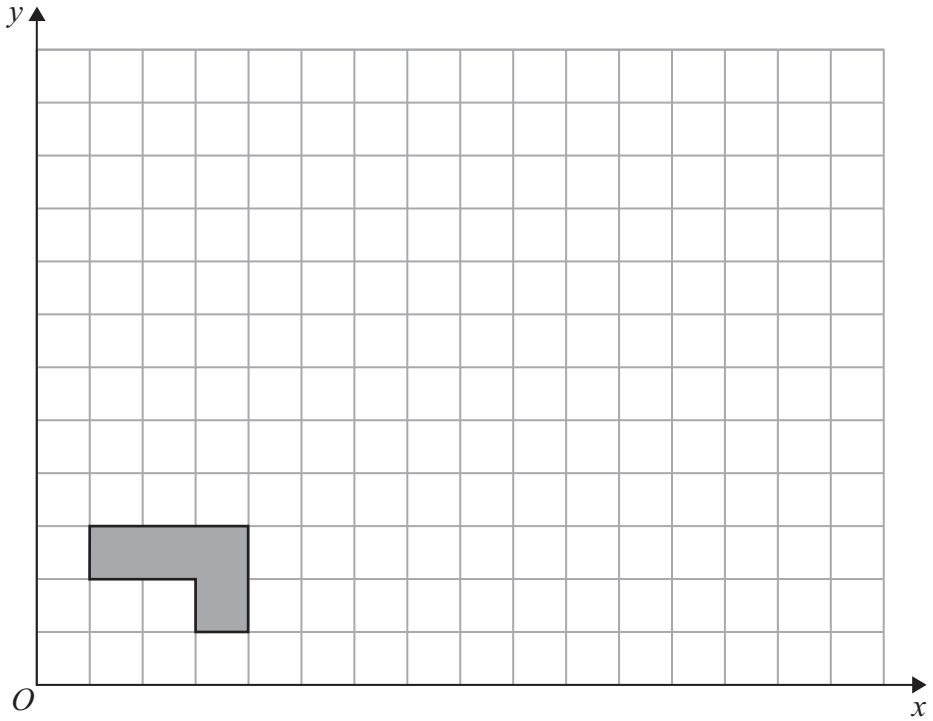
(Total 3 marks)

5.



(a) Reflect the shaded shape in the line $y = x$.

(2)



(b) On the grid, enlarge the shaded shape by a scale factor of 3, centre O.

(3)

Q5

(Total 5 marks)

20. (a) Write 56 as a product of its prime factors.

.....

(2)

(b) Find the Highest Common Factor (HCF) of 56 and 42

.....

(2)

(Total 4 marks)

Blank

Q20

Question 13

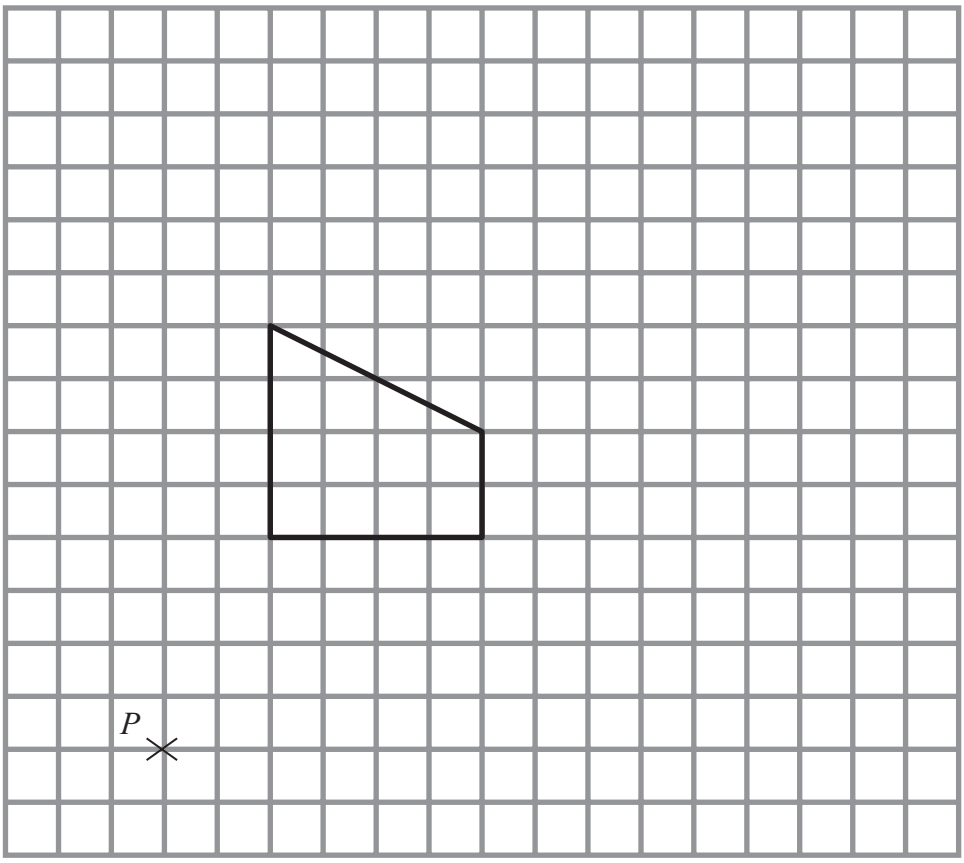
5 Find the Lowest Common Multiple (LCM) of 8 and 12

.....

(Total for Question 5 is 2 marks)

Question 14

2.



On the grid, enlarge the shape with a scale factor of $\frac{1}{2}$, centre P.

Q2

(Total 3 marks)

3. (a) Express 45 as a product of its prime factors.

.....

(2)

(b) Find the Highest Common Factor (HCF) of 45 and 30

.....

(2)

(Total 4 marks)

Q3

14. The table shows six expressions.
n is a positive integer.

$2n - 3$	$3n - 2$	$3(n + 4)$	$4n + 1$	$4(3n + 1)$	$2n + 1$

(a) From the table, write the expression whose value is

(i) always even

.....

(ii) always a multiple of 3

.....

(2)

(b) From the table, write the expression which is a factor of $4n^2 - 1$

.....

(1)

(Total 3 marks)

Q14

3 (a) Express 48 as a product of its prime factors.

.....

(2)

Buses to Exeter leave a bus station every 20 minutes.
Buses to Plymouth leave the bus station every 16 minutes.
A bus to Exeter and a bus to Plymouth both leave the bus station at 8am.

(b) When will buses to Exeter and to Plymouth next leave the bus station at the same time?

.....

(3)

(Total for Question 3 is 5 marks)

4. (a) Find the highest common factor (HCF) of 24 and 30

.....

(1)

(b) Find the lowest common multiple (LCM) of 4, 5 and 6

.....

(2)

Q4

(Total 3 marks)

14 (a) Factorise $x^2 + 7x$

.....

(1)

(b) Factorise $y^2 - 10y + 16$

.....

(2)

*(c) (i) Factorise $2t^2 + 5t + 2$

.....

(ii) t is a positive whole number.

The expression $2t^2 + 5t + 2$ can never have a value that is a prime number.

Explain why.

.....

.....

.....

(3)

(Total for Question 14 is 6 marks)

4 (a) Express 54 as a product of its prime factors.

.....

(2)

(b) Find the Lowest Common Multiple (LCM) of 45 and 54

.....

(2)

(Total for Question 4 is 4 marks)

Question 21

5 Write 525 as a product of its prime factors.

.....

(Total for Question 5 is 3 marks)

9 Matt and Dan cycle around a cycle track.

Each lap Matt cycles takes him 50 seconds.
Each lap Dan cycles takes him 80 seconds.

Dan and Matt start cycling at the same time at the start line.

Work out how many laps they will each have cycled when they are next at the start line together.

Matt..... laps

Dan..... laps

(Total for Question 9 is 3 marks)

13 (a) Express 180 as a product of its prime factors.

.....

(3)

Martin thinks of two numbers.

He says,

> "The Highest Common Factor (HCF) of my two numbers is 6
> The Lowest Common Multiple (LCM) of my two numbers is a multiple of 15"

(b) Write down **two** possible numbers that Martin is thinking of.

..... , ...

(2)

(Total for Question 13 is 5 marks)

11 Karl wants to raise money for charity.
He designs a game for people to play.

Karl uses a fair 10-sided dice for the game.
The dice is numbered from 1 to 10

Each person will roll the dice once.
A person wins the game if the dice lands on a multiple of 4

Ali plays the game once.

(a) Work out the probability that Ali will win the game.

.....

(2)

Each person pays 30p to play the game once.
The prize for a win is £1

Karl thinks that the game will be played 100 times.

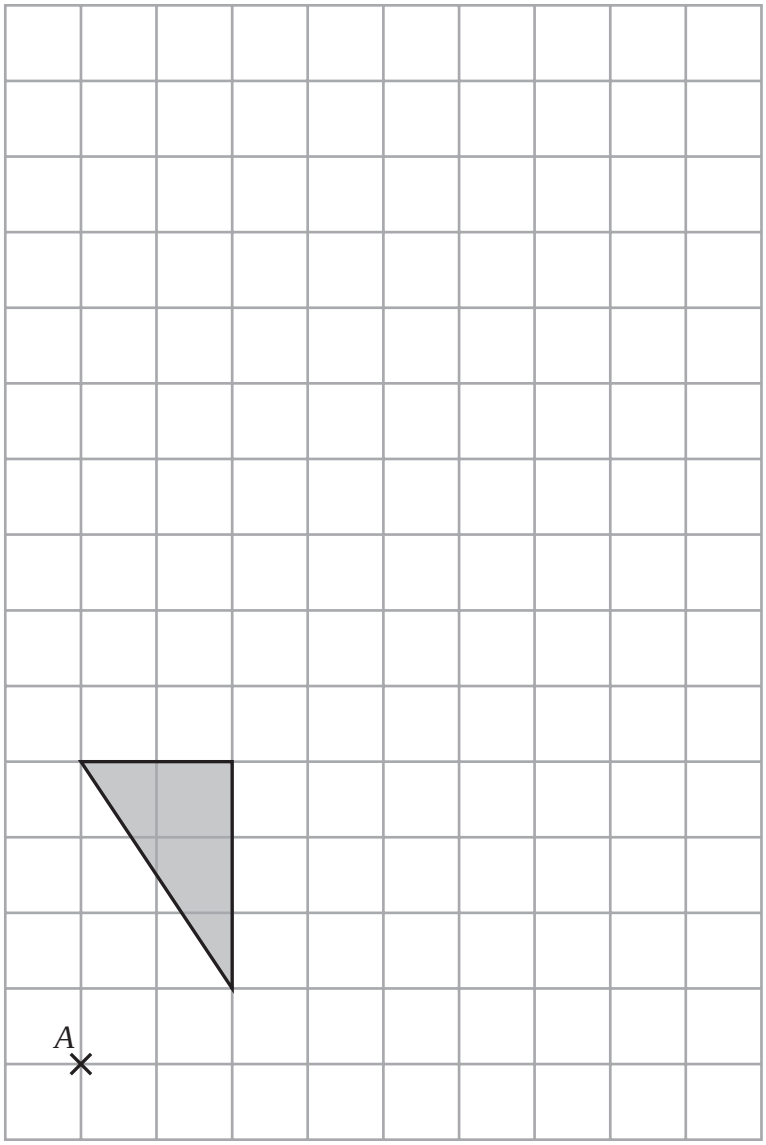
(b) Work out an estimate for how much money Karl will raise for charity.

.....

(3)

(Total for Question 11 is 5 marks)

4 A shaded shape is shown on the grid.



On the grid, enlarge the shape by a scale factor of 2, centre *A*.

(Total for Question 4 is 2 marks)

1 (a) Simplify $x^7 \times x^5$

.....

(1)

(b) Simplify $2y \div y$

.....

(1)

$v = 2t^2$

$t = 3$

(c) Work out the value of v.

.....

(1)

(d) Give an example to show that, when n is a whole number, $6n + 1$ is **not** always a prime number.
You must give your value of n.

$n =$ .....

(1)

(Total for Question 1 is 4 marks)

Question 27

2 Express 56 as the product of its prime factors.

.....

(Total for Question 2 is 2 marks)

Question 28

1 Write 36 as a product of its prime factors.

.....

(Total for Question 1 is 2 marks)

2 (a) Find the lowest common multiple (LCM) of 40 and 56

.....

(2)

$A = 2^3 \times 3 \times 5$ $B = 2^2 \times 3 \times 5^2$

(b) Write down the highest common factor (HCF) of A and B.

.....

(1)

(Total for Question 2 is 3 marks)

10 Here are three lamps.

lamp **A** lamp **B** lamp **C**



Lamp **A** flashes every 20 seconds.
Lamp **B** flashes every 45 seconds.
Lamp **C** flashes every 120 seconds.

The three lamps start flashing at the same time.

How many times in one hour will the three lamps flash at the same time?

.....

(Total for Question 10 is 3 marks)

Question 31

June 2019 | 1MA1/1H | Original Q3

3 Find the highest common factor (HCF) of 72 and 90

.....

(Total for Question 3 is 2 marks)

Question 32

November 2019 | 1MA1/1H | Original Q1

1 Find the Lowest Common Multiple (LCM) of 108 and 120

.....

(Total for Question 1 is 3 marks)

1 (a) Write 84 as a product of its prime factors.

.....

(2)

(b) Find the lowest common multiple (LCM) of 60 and 84

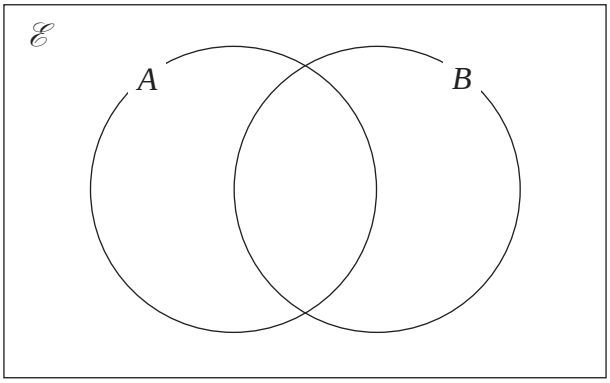
.....

(2)

(Total for Question 1 is 4 marks)

2 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{\text{even numbers}\}$
$B = \{\text{factors of } 10\}$

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set, $\mathscr{E}$

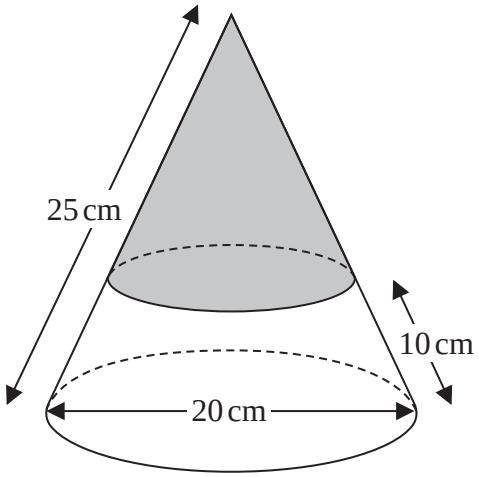
(b) Find the probability that this number is in the set $A \cap B$

.....

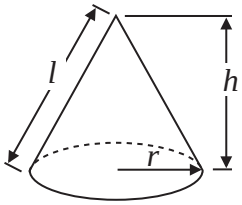
(2)

(Total for Question 2 is 5 marks)

18 The diagram represents a solid cone.



Curved surface area of cone = πrl



The cone has a base diameter of 20 cm and a slant height of 25 cm.

A circle is drawn around the surface of the cone at a slant height of 10 cm above the base.
The curved surface of the cone above the circle is painted grey.

Work out the area of the curved surface of the cone that is **not** painted grey.
Give your answer as a multiple of π
You must show all your working.

..... cm^2

(Total for Question 18 is 4 marks)

Question 36

20 Here is a list of five numbers.

98^{53} 98^{64} 98^{73} 98^{88} 98^{91}

Find the lowest common multiple of these five numbers.

.....

(Total for Question 20 is 1 mark)

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

.....

(2)

(b) Find the Lowest Common Multiple (LCM) of 24 and 40

.....

(2)

(Total for Question 2 is 4 marks)

2 Write 124 as a product of its prime factors.

.....

(Total for Question 2 is 2 marks)

Question 39

1 Write 500 as a product of powers of its prime factors.

.....

(Total for Question 1 is 3 marks)

8 Two numbers m and n are such that

m is a multiple of 5
n is an even number
the highest common factor (HCF) of m and n is 7

Write down a possible value for m and a possible value for n.

m = ...

n = ...

(Total for Question 8 is 2 marks)

16 (a) Prove that

$$(2m + 1)^2 - (2n - 1)^2 = 4(m + n)(m - n + 1)$$

(3)

Sophia says that the result in part (a) shows that the difference of the squares of any two odd numbers must be a multiple of 4

(b) Is Sophia correct?
You must give reasons for your answer.

.....

.....

.....

(1)

(Total for Question 16 is 4 marks)

Question 42

2 Write 60 as a product of its prime factors.

.....

(Total for Question 2 is 2 marks)

5 A and B are numbers such that

$$A = 2^2 \times 3^4 \times 7$$
$$B = 3^2 \times 7^2$$

(a) Find the highest common factor (HCF) of A and B.

.....

(1)

(b) Find the lowest common multiple (LCM) of A and B.

.....

(2)

(Total for Question 5 is 3 marks)

3 (a) Write 156 as a product of its prime factors.

.....

(2)

(b) Find the highest common factor (HCF) of 156 and 130

.....

(2)

(Total for Question 3 is 4 marks)

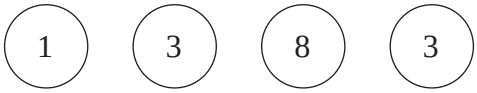
16 Zia has to set a 4-digit security passcode on her phone.

Each digit of the passcode is a number from 1 to 9
She can use each number more than once.

Zia tells her friend Amber that

the first digit is a cube number
the second digit is a prime number
the third digit is greater than 6
the fourth digit is an odd number.

The diagram shows one possible 4-digit passcode.



Amber is going to have one attempt at guessing Zia's passcode.

Work out the probability that Amber guesses Zia's passcode on the first attempt.

.....

(Total for Question 16 is 3 marks)

2 (a) Write 90 as a product of its prime factors.

.....

(2)

$A = 2^2 \times 3$

$B = 2 \times 3^2$

(b) Write down the lowest common multiple (LCM) of A and B.

.....

(1)

(Total for Question 2 is 3 marks)

Question 47

1 Find the highest common factor (HCF) of 63 and 105

.....

(Total for Question 1 is 2 marks)

Question 48

1 Find the highest common factor (HCF) of 54 and 120

.....

(Total for Question 1 is 2 marks)

1 (a) Express 250 as a product of its prime factors.

.....

(2)

(b) Find the lowest common multiple (LCM) of 30 and 25

.....

(2)

(Total for Question 1 is 4 marks)