

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

Number

Problem solving: Finding the HCF and LCM

v1.0

Name _____

Materials

For this paper you must have:

- Mathematical instruments

Information

- The marks for questions are shown in brackets

Advice

- In all calculations, show clearly how you work out your answer

Questions 1 to 3 are **foundation** tier only

For questions 1 to 3 you must **NOT** use a calculator.



Q1.

A piano competition takes place every 3 years.

A violin competition takes place every 4 years.

Both competitions took place in 2009

- (a) In which of these years did the **violin** competition take place?

Circle your answer.

1992

1993

1994

1995

(1)

- (b) When is the next year after 2009 that **both** competitions will take place?

(1)

- (c) In any leap year, the number made by the last two digits is divisible by 4

For example, 1996 and 2004 were leap years because 96 and 04 are divisible by 4

Give a reason why the violin competition will **never** take place in a leap year.

(1)

(Total 3 marks)

Q2.

Adrian changes his car every three years.

Brian changes his car every eight years.

Both changed their car in 2022.

- (a) In which of these years did Adrian change his car?

Circle your answer.

2009

2010

2011

2014

(1)

- (b) When is the next year after 2022 that **both** Adrian and Brian change their cars?

(1)

- (c) In any leap year, the number made by the last two digits is divisible by four.

For example, 2004 and 2016 were leap years because 04 and 16 are divisible by four.

Give a reason why Brian will never change his car in a leap year.

(1)

(Total 3 mark)

Q3.

Pens are sold in boxes of 10

Pencils are sold in boxes of 8

Rulers are sold in boxes of 5

A teacher wants to buy the same number of pens, pencils and rulers.

Work out the **smallest** number of boxes of each item he could buy.

(Total 3 marks)

Questions 4 to 13 are **higher** tier only

For questions 4 to 6 you must **NOT** use a calculator.



Q4.

- (a) Circle the highest common factor (HCF) of $4x^2y$ and $8xy^3$
- $2xy$ $4xy$ $8x^2y^3$ $8x^3y^4$ $32x^2y^3$
- (1)

- (b) Circle the lowest common multiple (LCM) of $4x^2y$ and $8xy^3$
- $2xy$ $4xy$ $8x^2y^3$ $8x^3y^4$ $32x^2y^3$
- (1)

(Total 2 marks)

Q5.

The first buses to X and Y leave a bus station at 7 am

Buses to X leave every 25 minutes.

Buses to Y leave every 20 minutes.

When will the buses to X and Y next leave at the same time?

(Total 3 marks)

Q6.

- (a) Simplify $2x^3y^2 \times 4xy^5$
- (2)

- (b) Factorise fully $20y^2 - 8xy$
- (2)

- (c) Make x the subject of $w = y + \frac{x}{r}$
- (2)

- (d) Work out the least common multiple (LCM) of $6xy^2$ and $3x^2y$
- (2)

(Total 8 marks)

For questions 7 to 13 you may use a calculator.



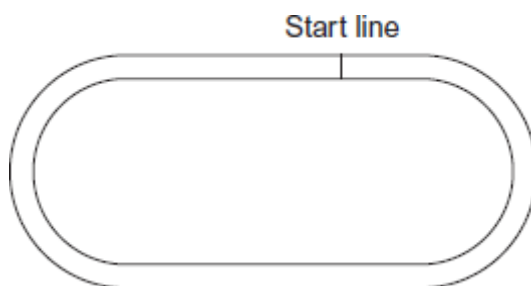
Q7.

- Circle the highest common factor (HCF) of $6xy^2$ and $4x^3y$
- $2xy^2$ $2xy$ $12x^3y^2$ $24x^4y^3$
- (Total 1 mark)

Q8.

Chris and Becky cycle around a 200 metre track in the same direction.

Not drawn accurately



- (a) Chris cycles at a steady speed of 10 metres per second.
Show that he takes 20 seconds to go **once** around the track.
- (b) Becky also cycles at a steady speed.
It takes her 25 seconds to go **once** around the track.
She leaves the start line at the same time as Chris.
How far has Becky cycled when they are next at the start line together?

(1)

(3)

(Total 4 marks)

Q9.

Jenny buys packs of sausages and packs of bread rolls.

There are

25 bread rolls in a pack

8 sausages in a pack

She needs exactly **twice** as many sausages as bread rolls.

Work out the smallest number of each pack she could buy.

(Total 3 marks)

Q10.

Q and R are two numbers.

As a product of prime factors,

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

$$R = 2^4 \times 3^2 \times a^2$$

- (a) The highest common factor (HCF) of Q and R is 4056
Work out the value of a .
- (b) Work out the lowest common multiple (LCM) of Q and R .

(2)

(2)

(Total 4 marks)

Q11.

To make one cheese sandwich, Gina uses one bread roll and two cheese slices.

Pack of 15 bread rolls

£1.88

Pack of 20 cheese slices

£2.15

She is going to buy enough packs to
have exactly twice as many cheese slices as bread rolls
make **more than** 100 cheese sandwiches.

Work out the least amount she can spend.

(Total 4 marks)

Q12.

- (a) I am thinking of two different numbers.
They are both greater than 10
Their highest common factor (HCF) is half the smaller number.
Work out one possible pair of numbers.

(1)

- (b) a , b and c are prime numbers.

$$N = a^3 \times b^2 \times c$$

Is N always odd?

Tick a box.

Yes

☐

No

☐

Give reasons for your answer.

(2)**(Total 3 marks)****Q13.**

- (a) I am thinking of two different integers.
They are both less than 10
Their lowest common multiple (LCM) is four times the larger number.

Work out one possible pair of numbers.

(1)

- (b) a , b and c are different prime numbers.

$$N = a \times b \times c$$

Is 6 the smallest possible value of N ?

Tick a box.

Yes

☐

No

☐

Give reasons for your answer.

(2)**(Total 3 marks)**