

Factors, multiples and primes

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 65 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber and a calculator for Section B.

Instructions

- Use black ink or black ballpoint pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided.
- **Section A** (questions 1 to 12): you must not use a calculator.
- **Section B** (questions 13 to 22): you may use a calculator.
- Do all rough work in this booklet. Cross through any work you do not want marked.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this booklet is 59.

Advice

- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

For teacher’s use

Q	Mark	Q	Mark
1		12	
2		13	
3		14	
4		15	
5		16	
6		17	
7		18	
8		19	
9		20	
10		21	
11		22	
TOTAL			

Section A**You must not use a calculator**Do not
write
outside
the box**1** Here are eight numbers.

4 9 12 15 17 21 24 27

(a) From the numbers, write down a multiple of 8

Answer _____

[1 mark]**(b)** From the numbers, write down a prime number.

Answer _____

[1 mark]**(c)** From the numbers, write down an odd number that is a factor of 36

Answer _____

[1 mark]**2** Here is a list of all the factors of 42, in order of size.

Two of the factors are missing.

1, 2, 3, , 7, , 21, 42

Write down the two missing factors.

Answer _____

[2 marks]**3** Circle the number that is a common multiple of 6 and 8

14 32 48 64

[1 mark]

- 4** Leah is thinking of a number.
Her number is a factor of 60
It is a multiple of 4
It is not a multiple of 3
It is greater than 10

What is Leah's number?

Answer _____

[2 marks]

- 5** Kai says,
"The highest common factor of 16 and 24 is 48"

(a) Explain why Kai is wrong.

[1 mark]

(b) Work out the highest common factor of 16 and 24

Answer _____

[1 mark]

- 6** Ben says,
"When you add two different prime numbers, the answer is always even."

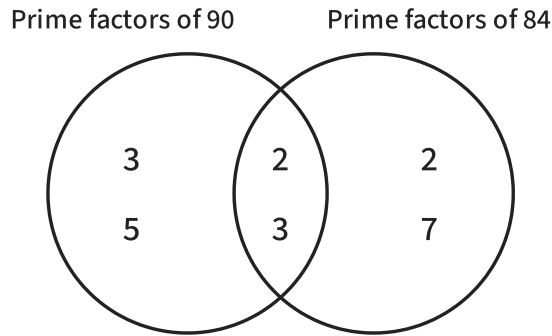
Give an example to show that Ben is wrong.

[1 mark]

7

The Venn diagram shows the prime factors of 90 and of 84

Do not
write
outside
the box



- (a) Write down the highest common factor of 90 and 84

Answer _____

[1 mark]

- (b) Work out the lowest common multiple of 90 and 84

Answer _____

[2 marks]

8

- (a) Write 252 as a product of prime factors.
Give your answer in index form.

Answer _____

[2 marks]

- (b) Hence write 252×21 as a product of prime factors in index form.

Answer _____

[1 mark]

- 9** In a bakery, one timer beeps every 14 minutes
A second timer beeps every 21 minutes
Both timers beep together at 7:00 am

How many more times will both timers beep together before 10:00 am?
You must show your working.

Answer _____

[3 marks]

- 10** The highest common factor of two numbers is 8
The lowest common multiple of the two numbers is 240
Both numbers are greater than 30 and less than 60

Work out the two numbers.

Answer _____

[3 marks]

11 $n = 2^4 \times 3^2 \times 5$

(a) $n \times k$ is a square number.

Work out the smallest possible whole number value of k .

Answer _____

[1 mark]

(b) $n \times m$ is a cube number.

Work out the smallest possible whole number value of m .

Answer _____

[2 marks]

12 $A = 2^a \times 3 \times 5^2$

$B = 2^3 \times 3^b \times 7$

a and b are positive whole numbers.

The highest common factor of A and B is 12

The lowest common multiple of A and B is $2^3 \times 3^4 \times 5^2 \times 7$

(a) Work out the value of a .

$a =$ _____

[1 mark]

(b) Work out the value of b .

$b =$ _____

[1 mark]

Section B

You may use a calculator

Do not
write
outside
the box

- 13** In a raffle, each entry has a number.
An entry wins a prize when its number is a multiple of 23
Here are the numbers of six entries.

417 437 483 512 598 633

- (a)** Which of these six entries win a prize?
Show how you decide.

Answer _____

[2 marks]

- (b)** What is the first winning number above 2000?

Answer _____

[2 marks]

- 14** Is 391 a prime number?
You must show your working.

[2 marks]

15 Here are six numbers.

2197 2304 2744 3025 3375 4096

(a) Write down all the cube numbers in the list.

Answer _____

[2 marks]

(b) One of the numbers is a square number and also a cube number.
Write down this number.
Show that it is a square number.

Answer _____

[1 mark]

16 A school has 500 lockers, numbered from 1 to 500
Every locker with a number that is a multiple of 13 has a red door.
Every locker with a number that is a multiple of 9 has a blue label.

(a) How many lockers have a red door?

Answer _____

[1 mark]

(b) How many lockers have a red door and a blue label?

Answer _____

[2 marks]

- 17** A car park has 432 spaces.
The spaces are in rows. Every row has the same number of spaces.
There are more than 15 rows and fewer than 25 rows.

Work out all the possible numbers of rows.

Answer _____

[3 marks]

- 18** A charity packs hygiene kits from 90 toothbrushes and 126 bars of soap.
It uses all of the toothbrushes and all of the bars of soap.
Each kit has the same number of toothbrushes and the same number of bars of soap.

(a) Work out the greatest number of kits the charity can make.

Answer _____

[2 marks]

(b) How many bars of soap are in each kit?

Answer _____

[1 mark]

- 19** A festival organiser buys cups in packs of 12
She buys plates in packs of 15 and napkins in packs of 18
She wants exactly the same number of cups, plates and napkins.
She needs more than 1000 of each.

What is the smallest number of cups she can buy?

Answer _____

[3 marks]

- 20** (a) Write 23 595 as a product of prime factors.
Give your answer in index form.

Answer _____

[2 marks]

- (b) Use your answer to (a) to explain why 23 595 is not a square number.

[1 mark]

- 21** A school buys some pens and some highlighters.
Every pen and every highlighter costs the same amount.
The pens cost £8.05 altogether. The highlighters cost £11.27 altogether.
Each item costs more than 50p.

(a) Work out the cost of one item.

Answer £ _____

[3 marks]

(b) How many items does the school buy altogether?

Answer _____

[1 mark]

- 22** Work out the smallest prime number that is greater than 900
You must show your working.

Answer _____

[3 marks]

END OF QUESTIONS