Name	ANSWERS	Class	

♦ MATHS TEACHER HUB

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Prime numbers
(9 – 1) Topic booklet
Foundation

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

Total Marks

Instructions
•Use **black** ink or ball-point pen.
•**Fill in the boxes** at the top of this page with your name, centre number and candidate number.
•Answer **all** questions.
•Answer the questions in the spaces provided
 – *there may be more space than you need.*
•Diagrams are NOT accurately drawn, unless otherwise indicated.
•You must **show all your working out.**
•If the question is a **1F** question you are not allowed to use a calculator.
•If the question is a **2F** or a **3F** question, you may use a calculator to help you answer.

Information
•The marks for **each** question are shown in brackets
 – *use this as a guide as to how much time to spend on each question.*

Advice
•Read each question carefully before you start to answer it.
•Keep an eye on the time.
•Try to answer every question.
•Check your answers if you have time at the end.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

4   Write down a prime number that is between 20 and 30

23 or 29

(Total for Question 4 is 1 mark)

7   Steve says,

"There are more prime numbers between 20 and 30
than there are between 10 and 20"

Is Steve right?
You must show how you get your answer.

2 primes   21   22   23   24   25   26   27   28   29
             x   x   ✓   x   x   x   x   x   ✓

4 primes   11   12   13   14   15   16   17   18   19
             ✓   x   ✓   x   x   x   ✓   x   ✓

Steve is wrong, there are 4 primes between 10-20
and 2 primes between 20-30

(Total for Question 7 is 2 marks)

9 Nidah writes down two different prime numbers.

She adds together her two numbers.
Her answer is a square number less than 30

Find two prime numbers that Nidah could have written down.

Primes = 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31,

Squares = 1, 4, 9, 16, 25,

2, 7
or 11, 5
or 13, 3
or 2, 23

(Total for Question 9 is 2 marks)

10 Write down two prime numbers that have a sum of 32

3, 29
or
13, 19

(Total for Question 10 is 2 marks)

3

10 (a) Write down all the prime numbers between 20 and 30

23 and 29

(2)

Catherine says,

"2 is the only even prime number."

(b) Is Catherine right?
You must give a reason for your answer.

There is only 1 even prime numbe, the number 2.

(1)

(Total for Question 10 is 3 marks)

12 Write down three prime numbers that are between 20 and 40

23,
29,
31,
37,

23 , 29 , 31

(Total for Question 12 is 2 marks)

16 Find the Highest Common Factor (HCF) of 24 and 60

24
1 × 24
2 × 12
3 × 8
4 × 6

60
1 × 60
2 × 30
3 × 20
4 × 15
5 × 12
6 × 10

HCF = 12

(Total for Question 16 is 2 marks)

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

500
2 250
2 125
5 25
5 5
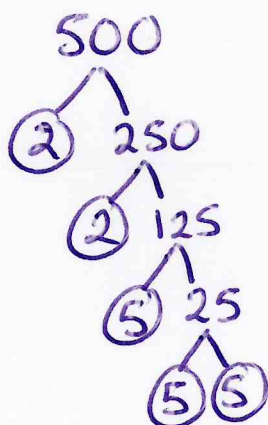
2 × 2 × 5 × 5 × 5

$2^2 \times 5^3$

(Total for Question 19 is 3 marks)

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

156

2   78

2   39

3   13
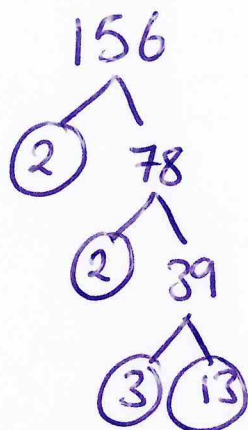
$2 \times 2 \times 3 \times 13$

$2^2 \times 3 \times 13$

(2)

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

130

2   65

5   13

2
3   2
13   5

$2 \times 13 = 26$

$HCF = 26$

(2)

(Total for Question 20 is 4 marks)
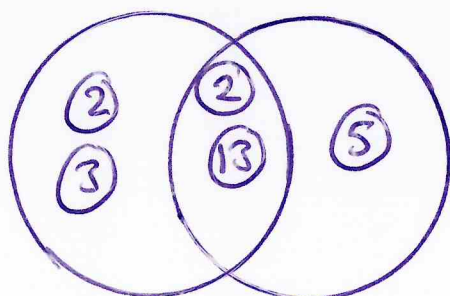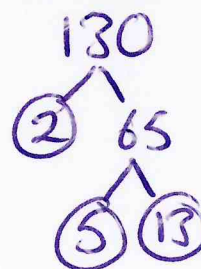
20 Find the Lowest Common Multiple (LCM) of 108 and 120

108
② 54
② 27
③ 9
③ ③

120
② 60
② 30
② 15
③ ⑤

[Venn diagram: left circle contains ③ ③; intersection contains ② ② ③; right circle contains ② ⑤]

LCM = 1080

(Total for Question 20 is 3 marks)
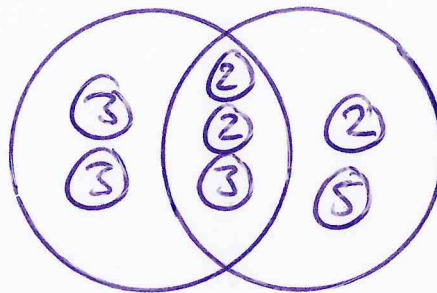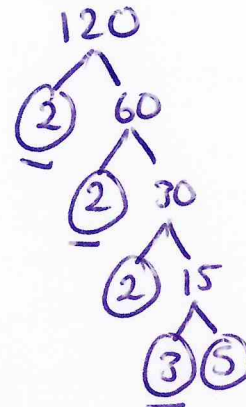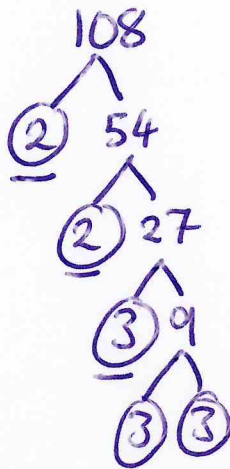
21 (a) Write 90 as a product of its prime factors.

90

2 45

5 9

3 3

$2 \times 3 \times 3 \times 5$

$2 \times 3^2 \times 5$

(2)
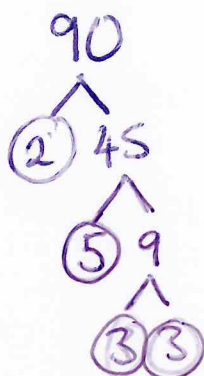
$A = 2^2 \times 3$ $= 2 \times 2 \times 3$

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

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

2   2 3   3

$LCM = 36$

(1)

(Total for Question 21 is 3 marks)
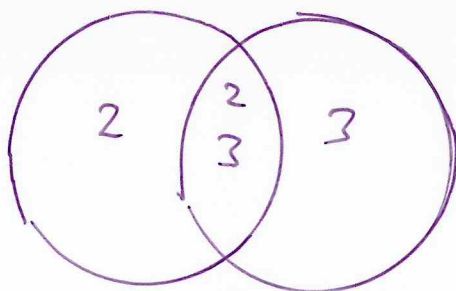
21 Write 60 as a product of its prime factors.

60

2   30

2   15

3   5
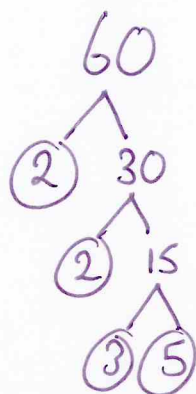
$2 \times 2 \times 3 \times 5$

$2^2 \times 3 \times 5$

(Total for Question 21 is 2 marks)

21 Work out the lowest common multiple (LCM) of 24 and 56

24

2   12

2   6

2   3

56

2   28

2   14

2   7

3   2 2 2   7
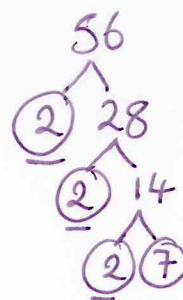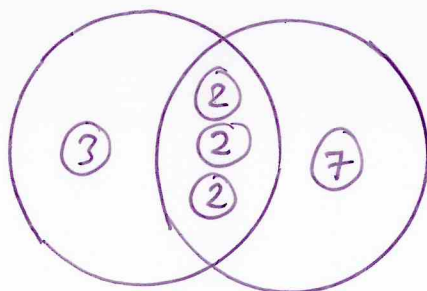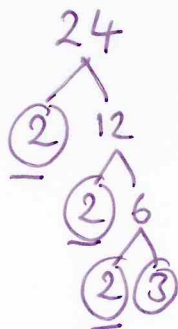
$LCM = 168$

(Total for Question 21 is 2 marks)

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

84
2 42
2 21
3 7
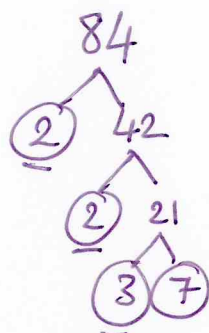
$2 \times 2 \times 3 \times 7$

$2^2 \times 3 \times 7$

(2)

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

60
2 30
2 15
3 5

LCM = 420

(2)

(Total for Question 21 is 4 marks)
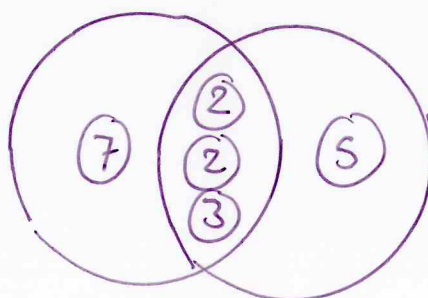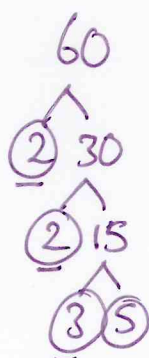
21 (a) Find the lowest common multiple (LCM) of 40 and 56

40
2 20
2 10
2 5

(circles) 5 | 2 2 2 | 7

56
2 28
2 14
2 7

LCM = 280

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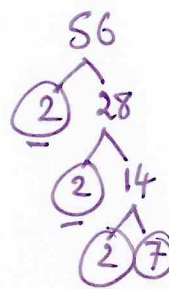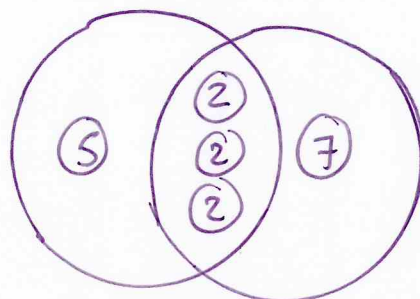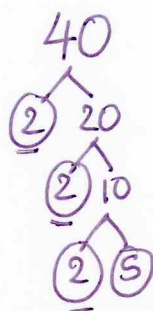
$A = 2^3 \times 3 \times 5$ $B = 2^2 \times 3 \times 5^2$

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

$2 \times 2 \times 2 \times 3 \times 5$ $2 \times 2 \times 3 \times 5 \times 5$

$2 \times 2 \times 3 \times 5 = 60$

HCF = 60

(1)

(Total for Question 21 is 3 marks)

21 Find the highest common factor (HCF) of 32, 48 and 72

32
1 × 32
2 × 16
4 × 8

48
1 × 48
2 × 24
3 × 16
4 × 12
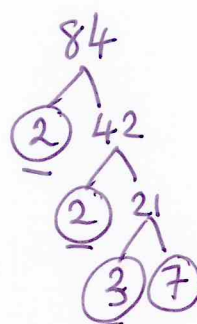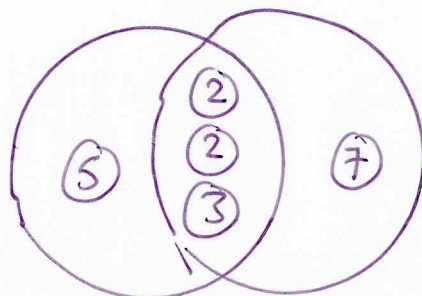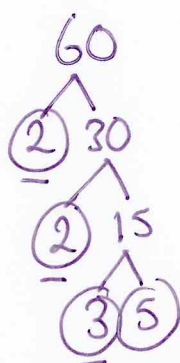6 × 8

72
1 × 72
2 × 36
3 × 24
4 × 18
6 × 12
8 × 9

HCF = 8

(Total for Question 21 is 2 marks)

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

63

③ 21

③ ⑦

105
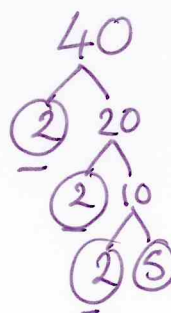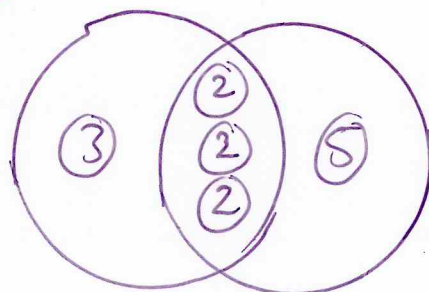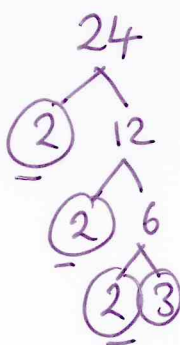
⑤ 21

③ ⑦

HCF = 21

(Total for Question 22 is 2 marks)
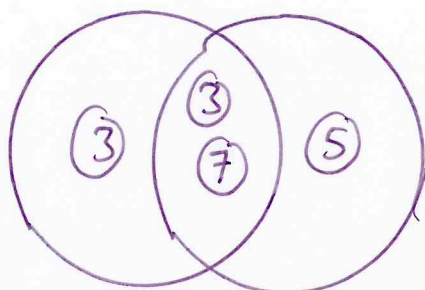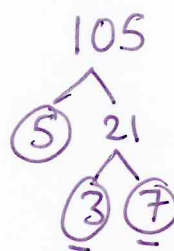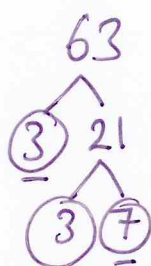
22 (a) Find the Highest Common Factor (HCF) of 60 and 84

60
(2) 30
(2) 15
(3)(5)

84
(2) 42
(2) 21
(3)(7)

Venn diagram: left circle contains (5), intersection contains (2)(2)(3), right circle contains (7)

HCF = 12

(2)

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

24
(2) 12
(2) 6
(2)(3)

40
(2) 20
(2) 10
(2)(5)

Venn diagram: left circle contains (3), intersection contains (2)(2)(2), right circle contains (5)

LCM = 120

(2)

(Total for Question 22 is 4 marks)

13

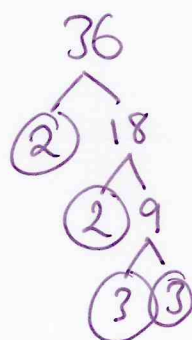**22** Express 56 as the product of its prime factors.

56
2 ⌃ 28
　 2 ⌃ 14
　　 2 ⌃ 7

$2 \times 2 \times 2 \times 7$

$2^3 \times 7$
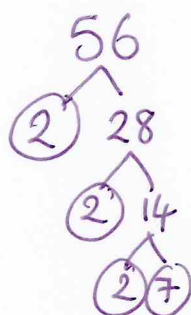
(Total for Question 22 is 2 marks)

23 Write 36 as a product of its prime factors.

36
2 ⌃ 18
　 2 ⌃ 9
　　 3 ⌃ 3

$2 \times 2 \times 3 \times 3$

$2^2 \times 3^2$

(Total for Question 23 is 2 marks)

24 Ali buys packs of balloons and boxes of pencils.
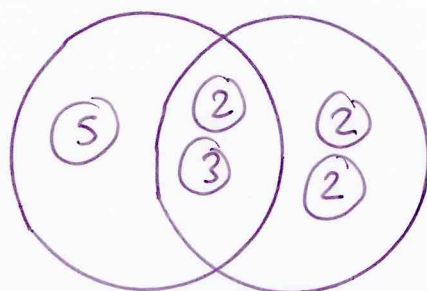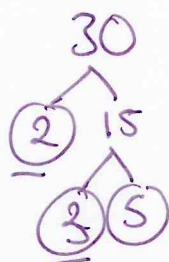
There are 30 balloons in each pack.
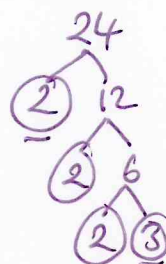There are 24 pencils in each box.

Ali buys exactly the same number of balloons and pencils.

Work out how many packs of balloons and how many boxes of pencils she could have bought.
You must show all your working.

30
2 15
3 5

(5) (2)(3) (2)(2)

LCM=120

24
2 12
2 6
2 3

$120 \div 30 = 4$

$120 \div 24 = 5$

4 .... packs of balloons

5 .... boxes of pencils

(Total for Question 24 is 3 marks)

24 Write 124 as a product of its prime factors.

124

2   62

2   31
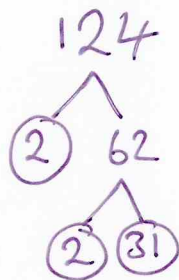
$2 \times 2 \times 31$

$2^2 \times 31$

(Total for Question 24 is 2 marks)

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

72

2   36

2   18

2   9

3   3

2   2

3

2

5

3

90

2   45

3   15

3   5
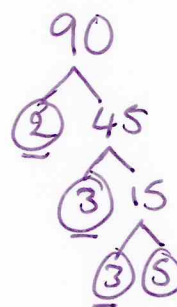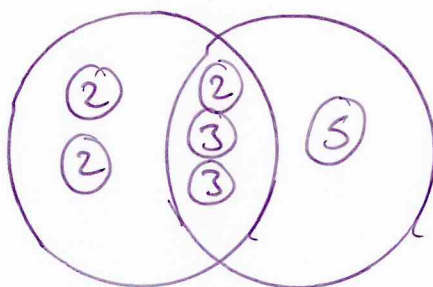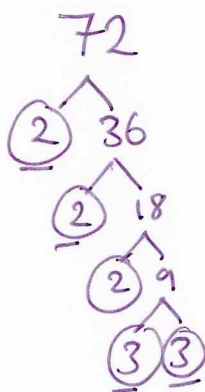
HCF = 18

(Total for Question 24 is 2 marks)

25 Write 504 as a product of powers of its prime factors.

504
2 — 252
   2 — 126
      2 — 63
         3 — 21
            3 — 7

$2 \times 2 \times 2 \times 3 \times 3 \times 7$

$2^3 \times 3^2 \times 7$

(Total for Question 25 is 3 marks)