Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Factors, multiples and primes

Time allowed: 40 minutes

Subject code **0580**

Mathematics

Questions from Paper 1, Paper 2, Paper 3 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 33

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 33 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1

7	27	39	49	99	112

From the list of numbers, write down

(a) an even number

..... [1]

(b) a square number

..... [1]

(c) a factor of 56

..... [1]

(d) a prime number.

..... [1]

(a) Types of number (b) Types of number (c) Types of number (d) Types of number Click for more variations

1(a)	112	**1**	
1(b)	49	**1**	
1(c)	7	**1**	
1(d)	7	**1**	

2 Write down all the square numbers which are factors of 100.

Answer ..... [2]

Types of number Click for more variations

2	1, 4, 25, 100	2	**B1** for any two and none incorrect. −1 each incorrect

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3 Find the lowest common multiple (LCM) of 24 and 28.

..... [2]

HCF and LCM Click for more variations

3	168	**2**	**B1** for 168*k* as final answer or **M1** for [24 =] 2 × 2 × 2 × 3 **and** [28 =] 2 × 2 × 7 or 2 correct factor trees or tables or a list of multiples of both 24 and 28 with at least 3 of each or 2 × 2 × 2 × 3 × 7

4 Find the highest common factor (HCF) of 48 and 80.

..... [2]

HCF and LCM Click for more variations

4	16	**2**	**B1** for answer 2 or 4 or 8 or **M1** for 2 × 2 × 2 × 2 oe as final answer or [48 =] 2 × 2 × 2 × 2 × 3 and [80 =] 2 × 2 × 2 × 2 × 5 or for 2 correct factor trees or tables

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5 **(a)** Write 30 as a product of its prime factors.

Answer(a) ..... [2]

(b) Find the lowest common multiple (LCM) of 30 and 45.

Answer(b) ..... [2]

(a) Prime factor decomposition (b) HCF and LCM Click for more variations

5	**(a)**	$2 \times 3 \times 5$	**2**	**B1** for 2, 3, 5 as prime factors
	(b)	90	**2**	**B1** for $90k$ or for listing multiples of each up to 90 or $2 \times 3^2 \times 5$

6 $A = 2^3 \times 3$ $B = 3^2 \times 5$

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

..... [1]

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

..... [2]

(a) HCF and LCM (b) HCF and LCM Click for more variations

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6(a)	3	**1**	
6(b)	360	**2**	**B1** for answer $360k$, $k > 1$ or **M1** for $2^3 \times 3^2 \times 5$ oe or for 24, 48, 72… **and** 45, 90, 135… seen

7 **(a)** Write 2025 as the product of its prime factors.

..... [2]

(b) Write 2025 as a product of two square numbers that are both greater than one.

..... [1]

(a) Prime factor decomposition (b) Types of number Click for more variations

7(a)	$3^4 \times 5^2$	**2**	**B1** for 3,3,3,3,5,5 or **M1** for correct factor tree/diagram/list/table
7(b)	25×81 or 225×9	**1**	

8 The highest common factor (HCF) of two numbers is 6.
The lowest common multiple (LCM) of the two numbers is 90.
Both numbers are greater than 6.

Work out the two numbers.

..... and ..... [2]

HCF and LCM Click for more variations

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8	18 30	**2**	**B1** for 2 numbers with HCF 6 or LCM 90 or for 2 numbers greater than 6 with product 540 OR **M1** for some multiples of 6 including 18 and 30 or for some factors of 90 including 18 and 30 or for a tree diagram/table showing prime factors of 540 or 6 **and** 90

9 A number, n, is a factor of 144 and a multiple of 9.

Find all the values for n.

..... [3]

Types of number Click for more variations

9	9, 18, 36, 72, 144	**3**	**B2** for 3 correct and no extras or 5 correct and 1 extra as the answer or **B1** for two correct and no extras or **M1** factors of 144 up to 72 or multiples of 9 up to 72

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10 **(a)** **(i)** Write 180 as a product of its prime factors.

..... [2]

(ii) Find the lowest common multiple (LCM) of 180 and 54.

..... [2]

(b) An integer, X, written as a product of its prime factors is $a^2 \times 7^{b+2}$.
An integer, Y, written as a product of its prime factors is $a^3 \times 7^2$.

The highest common factor (HCF) of X and Y is 1225.
The lowest common multiple (LCM) of X and Y is 42 875.

Find the value of X and the value of Y.

$X =$ .....

$Y =$ ..... [4]

(a)(i) Prime factor decomposition (a)(ii) HCF and LCM (b) HCF and LCM Click for more variations

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10(a)(i)	$2^2 \times 3^2 \times 5$ oe	**2**	**M1** for 3 correct prime factors in a tree or table seen before the first error or for 2, 3, 5 identified
10(a)(ii)	540	**2**	**M1** for $2^2 \times 3^3 \times 5$ or 2×3^3 shown or answer $540k$

10(b)	$X = 8575$ $Y = 6125$	**4**	**B3** for $X = 8575$ or $Y = 6125$ or **B2** for $a = 5$ or $b = 1$ soi or **B1** for $1225 = 5^2 \times 7^2$ or $42\,875 = 5^3 \times 7^3$ or **M1** for $a^2 \times 7^2$ [= 1225] or $a^3 \times 7^{b+2}$ [= 42 875]

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