



EP.M108 Factors, Multiples and Primes Puzzle Set

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 55 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 Which of these numbers is a prime number?

- ☐ A) 39
- ☐ B) 42
- ☐ C) 43
- ☐ D) 45
- ☐ E) 49

(Total for Question 1 is 1 mark)

2 Which of these numbers has exactly three positive factors?

- ☐ A) 48
- ☐ B) 49
- ☐ C) 50
- ☐ D) 51
- ☐ E) 52

(Total for Question 2 is 1 mark)

3 List all the factor pairs of 36.

(Total for Question 3 is 2 marks)

4 Work out the highest common factor (HCF) of 48 and 180.

(Total for Question 4 is 2 marks)

5 Find the lowest common multiple (LCM) of 8 and 12.

(Total for Question 5 is 2 marks)

6 Find the two-digit number between 1 and 100 that is a multiple of 7, is not a multiple of 3, and whose digits add to 7.

(Total for Question 6 is 2 marks)

7 What is the smallest prime factor of 143?

- ☐ A) 7
- ☐ B) 11
- ☐ C) 13
- ☐ D) 17
- ☐ E) 19

(Total for Question 7 is 1 mark)

8 Give an example of a square number less than 100 that has exactly three positive factors.

(Total for Question 8 is 1 mark)

9 Work out the number of positive factors of 72.

(Total for Question 9 is 2 marks)

10 Priya thinks of a number less than 100. It is even, has exactly 6 positive factors, and the sum of its digits is 8. What is Priya's number?

(Total for Question 10 is 2 marks)

11 Which of the following is a prime number?

- ☐ A) 51
- ☐ B) 57
- ☐ C) 59
- ☐ D) 63
- ☐ E) 65

(Total for Question 11 is 1 mark)

12 Write down all the prime numbers between 20 and 40.

(Total for Question 12 is 2 marks)

13 Work out the highest common factor (HCF) of 84, 126 and 210.

(Total for Question 13 is 2 marks)

14 Find the least common multiple (LCM) of 9, 12 and 15.

(Total for Question 14 is 2 marks)

15 A number is the product of two consecutive prime numbers and is less than 100. Find all such numbers.

(Total for Question 15 is 3 marks)

16 Which number could be the difference between two prime numbers both greater than 2?

- ☐ A) 13
- ☐ B) 14
- ☐ C) 15
- ☐ D) 21
- ☐ E) 27

(Total for Question 16 is 1 mark)

17 Find the smallest composite number that has exactly 8 positive divisors.

(Total for Question 17 is 1 mark)

18 A number between 1 and 200 is divisible by both 4 and 9, but it is not divisible by 8. Give the smallest such number.

(Total for Question 18 is 2 marks)

19 Which of the following is NOT a factor of 360?

- ☐ A) 5
- ☐ B) 6
- ☐ C) 9
- ☐ D) 10
- ☐ E) 7

(Total for Question 19 is 1 mark)

20 Find all positive integers n with $n < 50$ such that n has exactly four prime factors when counted with multiplicity. List them.

(Total for Question 20 is 3 marks)

Mark scheme · EP.M108 Factors, Multiples and Primes Puzzle Set

Question 1

- **B1** correct option C (43) cao
- **Answer: C) 43**

Question 2

- **B1** correct option B (49) cao
- **Answer: B) 49**

Question 3

- **M1** some correct factor pairs seen, including 1×36 oe
- **A1** all factor pairs listed: 1×36 , 2×18 , 3×12 , 4×9 , 6×6 cao
- **Answer: 1×36 , 2×18 , 3×12 , 4×9 , 6×6**

Question 4

- **M1** correct method: prime factors or common factor list seen (e.g. $48 = 2^4 \times 3$, $180 = 2^2 \times 3^2 \times 5$) or equivalent
- **A1** 12 cao
- **Answer: 12**

Question 5

- **M1** method seen: $8 = 2^3$, $12 = 2^2 \times 3$ so $\text{LCM} = 2^3 \times 3$ or equivalent
- **A1** 24 cao
- **Answer: 24**

Question 6

- **M1** method to list two-digit multiples of 7 and check digit sum and divisibility by 3 seen (e.g. multiples: 14, 21, 28, ..., 98)
- **A1** 70 cao
- **Answer: 70**

Question 7

- **B1** correct option B (11) cao
- **Answer: B) 11**

Question 8

- **B1** 49 or 25 or 9 etc (a prime square) cao
- **Answer: Example: 49**

Question 9

- **M1** prime factor method seen: $72 = 2^3 \times 3^2$ or equivalent
- **A1** 12 cao
- **Answer: 12**

Question 10

- **M1** method to find numbers with 6 factors (form $p^2 \times q$ with distinct primes, or similar) and check even ones
- **A1** 44 cao
- **Answer: 44**

Question 11

- **B1** correct option C (59) cao
- **Answer: C) 59**

Question 12

- **M1** some primes in range listed correctly
- **A1** all primes: 23, 29, 31, 37 cao
- **Answer: 23, 29, 31, 37**

Question 13

- **M1** method seen: prime factors or common factor listing ($84=2^2 \cdot 3 \cdot 7$, $126=2 \cdot 3^2 \cdot 7$, $210=2 \cdot 3 \cdot 5 \cdot 7$)
- **A1** 42 cao
- **Answer: 42**

Question 14

- **M1** method seen: $9=3^2$, $12=2^2 \cdot 3$, $15=3 \cdot 5$ so $\text{LCM} = 2^2 \cdot 3^2 \cdot 5$
- **A1** 180 cao
- **Answer: 180**

Question 15

- **M1** some consecutive prime products listed (e.g. 2×3 , 3×5) seen
- **M1** method continued correctly to consider primes until product ≥ 100
- **A1** full list: 6, 15, 35, 77 cao
- **Answer: 6, 15, 35, 77**

Question 16

- **B1** correct option B (14) cao
- **Answer: B) 14**

Question 17

- **B1** 24 cao
- **Answer: 24**

Question 18

- **M1** method seen: number must be multiple of $\text{LCM}(4,9)=36$ and check multiples
- **A1** 36 cao
- **Answer: 36**

Question 19

- **B1** correct option E (7) cao
- **Answer: E) 7**

Question 20

- **M1** method to consider prime-power forms giving 4 prime factors (p^4 , $p^3 \cdot q$, $p^2 \cdot q^2$, etc.) seen
- **M1** correct candidates found under 50 (e.g. 16, 24, 36, 40) or equivalent working
- **A1** full correct list: 16, 24, 36, 40 cao
- **Answer: 16, 24, 36, 40**