2.85 Factors, Multiples and Primes Puzzle Set: Test Pack

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

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

(3)

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

(2)

---

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

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

---

4 What is the smallest prime factor of 143?

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

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

(1)

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6 Which of these numbers is a prime number?

- ☐ A) 143
- ☐ B) 137
- ☐ C) 119
- ☐ D) 85
- ☐ E) 133

---

7 Write 120 as a product of its prime factors.

- ☐ A) $2 \times 3 \times 5^3$
- ☐ B) $2^2 \times 3 \times 5$
- ☐ C) $2 \times 3 \times 5$
- ☐ D) $2^3 \times 3 \times 5$
- ☐ E) $3 \times 5 \times 8$

---

8 What is the lowest common multiple of 4 and 18?

- ☐ A) 37
- ☐ B) 36
- ☐ C) 72
- ☐ D) 22
- ☐ E) 2

---

9 How many factors does 64 have? (Include 1 and 64.)

- ☐ A) 3
- ☐ B) 5
- ☐ C) 7
- ☐ D) 6
- ☐ E) 8

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10 Which of these numbers is a prime number?

- ☐ A) 85
- ☐ B) 21
- ☐ C) 143
- ☐ D) 109
- ☐ E) 95

---

11 Write 245 as a product of its prime factors.

- ☐ A) 5^2 x 7
- ☐ B) 5 x 7^2
- ☐ C) 5 x 7
- ☐ D) 5
- ☐ E) 5 x 49

---

12 How many factors does 62 have? (Include 1 and 62.)

- ☐ A) 40
- ☐ B) 3
- ☐ C) 4
- ☐ D) 5
- ☐ E) 2

---

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

(2)

---

14 Two lighthouses flash together at noon. One does so every 5 seconds and the other every 24 seconds. After how many seconds will they next do so together?

- ☐ A) 240
- ☐ B) 120
- ☐ C) 48
- ☐ D) 1
- ☐ E) 119

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15 Which of these numbers is a prime number?

- ☐ A) 115
- ☐ B) 109
- ☐ C) 95
- ☐ D) 21
- ☐ E) 121

---

16 Write 126 as a product of its prime factors.

- ☐ A) $2^2 \times 3^2 \times 7$
- ☐ B) 2 x 3 x 7
- ☐ C) 2 x 7 x 9
- ☐ D) $2^2 \times 3 \times 7$
- ☐ E) $2 \times 3^2 \times 7$

---

17 What is the lowest common multiple of 25 and 12?

- ☐ A) 1
- ☐ B) 299
- ☐ C) 300
- ☐ D) 37
- ☐ E) 600

---

18 How many factors does 25 have? (Include 1 and 25.)

- ☐ A) 30
- ☐ B) 3
- ☐ C) 2
- ☐ D) 1
- ☐ E) 4

---

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

(1)

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20 What is the lowest common multiple of 6 and 21?

- [ ] A) 126
- [ ] B) 84
- [ ] C) 3
- [ ] D) 41
- [ ] E) 42

---

21 Which of these numbers is a prime number?

- [ ] A) 57
- [ ] B) 55
- [ ] C) 101
- [ ] D) 27
- [ ] E) 87

---

22 Write 189 as a product of its prime factors.

- [ ] A) 3 x 7
- [ ] B) 3^3 x 7
- [ ] C) 3^2 x 7
- [ ] D) 3 x 7^3
- [ ] E) 27 x 27

---

23 What is the lowest common multiple of 21 and 6?

- [ ] A) 3
- [ ] B) 126
- [ ] C) 42
- [ ] D) 84
- [ ] E) 41

---

24 How many factors does 119 have? (Include 1 and 119.)

- [ ] A) 5
- [ ] B) 4
- [ ] C) 2
- [ ] D) 3
- [ ] E) 40

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25 Which of these numbers is a prime number?

- [ ] A) 133
- [ ] B) 39
- [ ] C) 115
- [ ] D) 127
- [ ] E) 63

---

26 Write 252 as a product of its prime factors.

- [ ] A) 2 x 3 x 7
- [ ] B) 2^2 x 7
- [ ] C) 2^2 x 3 x 7^2
- [ ] D) 2^2 x 3^2 x 7
- [ ] E) 4 x 4 x 9

---

27 How many factors does 187 have? (Include 1 and 187.)

- [ ] A) 5
- [ ] B) 4
- [ ] C) 40
- [ ] D) 3
- [ ] E) 2

---

28 What is the lowest common multiple of 30 and 25?

- [ ] A) 150
- [ ] B) 149
- [ ] C) 750
- [ ] D) 5
- [ ] E) 151

---

29 What is the lowest common multiple of 30 and 12?

- [ ] A) 42
- [ ] B) 6
- [ ] C) 60
- [ ] D) 61
- [ ] E) 360

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30 Priya has two ribbons, 180 cm and 200 cm long, and cuts both into equal pieces with no ribbon left over. What is the greatest possible length of each piece, in cm?

- [ ] A) 36,000
- [ ] B) 10
- [ ] C) 180
- [ ] D) 1,800
- [ ] E) 20

---

31 Two buses leave the station together at noon. One does so every 15 minutes and the other every 14 minutes. After how many minutes will they next do so together?

- [ ] A) 420
- [ ] B) 209
- [ ] C) 29
- [ ] D) 210
- [ ] E) 1

---

32 How many factors does 122 have? (Include 1 and 122.)

- [ ] A) 40
- [ ] B) 3
- [ ] C) 4
- [ ] D) 2
- [ ] E) 5

---

33 Which of these numbers is a prime number?

- [ ] A) 39
- [ ] B) 37
- [ ] C) 27
- [ ] D) 21
- [ ] E) 85

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34 Which of these numbers is a prime number?

- ☐ A) 89
- ☐ B) 143
- ☐ C) 49
- ☐ D) 21
- ☐ E) 57

---

35 Which of these numbers is a prime number?

- ☐ A) 91
- ☐ B) 71
- ☐ C) 115
- ☐ D) 27
- ☐ E) 63

---

36 What is the lowest common multiple of 6 and 4?

- ☐ A) 2
- ☐ B) 13
- ☐ C) 11
- ☐ D) 24
- ☐ E) 12

---

37 What is the lowest common multiple of 30 and 21?

- ☐ A) 51
- ☐ B) 210
- ☐ C) 3
- ☐ D) 420
- ☐ E) 630

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38 Esme has two ribbons, 120 cm and 132 cm long, and cuts both into equal pieces with no ribbon left over. What is the greatest possible length of each piece, in cm?

- [ ] A) 12
- [ ] B) 15,840
- [ ] C) 6
- [ ] D) 1,320
- [ ] E) 120

---

39 What is the highest common factor of 65 and 80?

- [ ] A) 6
- [ ] B) 1,040
- [ ] C) 5,200
- [ ] D) 65
- [ ] E) 5

---

40 How many factors does 116 have? (Include 1 and 116.)

- [ ] A) 3
- [ ] B) 4
- [ ] C) 6
- [ ] D) 5
- [ ] E) 7

---

41 How many factors does 138 have? (Include 1 and 138.)

- [ ] A) 6
- [ ] B) 4
- [ ] C) 9
- [ ] D) 7
- [ ] E) 8

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42 Which of these numbers is a prime number?

- [ ] A) 91
- [ ] B) 17
- [ ] C) 95
- [ ] D) 143
- [ ] E) 119

---

43 Write 84 as a product of its prime factors.

- [ ] A) 2 x 3 x 7
- [ ] B) 2^3 x 3 x 7
- [ ] C) 2 x 3 x 7^2
- [ ] D) 4 x 4 x 7
- [ ] E) 2^2 x 3 x 7

---

44 What is the lowest common multiple of 14 and 25?

- [ ] A) 350
- [ ] B) 50
- [ ] C) 39
- [ ] D) 700
- [ ] E) 1

---

45 Which of these numbers is a prime number?

- [ ] A) 33
- [ ] B) 57
- [ ] C) 143
- [ ] D) 37
- [ ] E) 55

---

46 Write 135 as a product of its prime factors.

- [ ] A) 3^4 x 5
- [ ] B) 3^3
- [ ] C) 3 x 5^3
- [ ] D) 5 x 27
- [ ] E) 3^3 x 5

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47 What is the lowest common multiple of 5 and 6?

- [ ] A) 29
- [ ] B) 60
- [ ] C) 1
- [ ] D) 12
- [ ] E) 30

---

48 Which of these numbers is a prime number?

- [ ] A) 27
- [ ] B) 115
- [ ] C) 119
- [ ] D) 95
- [ ] E) 47

---

49 Write 600 as a product of its prime factors.

- [ ] A) $2^4 \times 3 \times 5^2$
- [ ] B) $2^2 \times 3 \times 5^2$
- [ ] C) 3 x 8 x 8
- [ ] D) $2^3 \times 3 \times 5^2$
- [ ] E) $2^2 \times 3^3 \times 5$

---

50 What is the highest common factor of 144 and 132?

- [ ] A) 19,008
- [ ] B) 6
- [ ] C) 12
- [ ] D) 1,584
- [ ] E) 132

---

51 Which of these numbers is a prime number?

- [ ] A) 77
- [ ] B) 67
- [ ] C) 65
- [ ] D) 39
- [ ] E) 27

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52 Write 196 as a product of its prime factors.

- ☐ A) 2 x 7
- ☐ B) 2^2 x 7^2
- ☐ C) 4 x 4
- ☐ D) 2 x 7^2
- ☐ E) 2^3 x 7^2

---

53 Two buses leave the station together at noon. One does so every 8 minutes and the other every 25 minutes. After how many minutes will they next do so together?

- ☐ A) 400
- ☐ B) 1
- ☐ C) 199
- ☐ D) 200
- ☐ E) 50

---

54 How many factors does 142 have? (Include 1 and 142.)

- ☐ A) 3
- ☐ B) 5
- ☐ C) 40
- ☐ D) 4
- ☐ E) 2

---

55 Work out the number of positive factors of 72.

(2)

---

56 What is the lowest common multiple of 25 and 3?

- ☐ A) 74
- ☐ B) 76
- ☐ C) 1
- ☐ D) 150
- ☐ E) 75

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Mark scheme · 2.85 Factors, Multiples and Primes Puzzle Set: Test Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

method to consider prime-power forms giving 4 prime factors (p^4, p^3*q, p^2*q^2, etc.) seen — **M1**

correct candidates found under 50 (e.g. 16, 24, 36, 40) or equivalent working — **M1**

full correct list: 16, 24, 36, 40 cao — **A1**

Answer: 16, 24, 36, 40

Question 2

some primes in range listed correctly — **M1**

all primes: 23, 29, 31, 37 cao — **A1**

Answer: 23, 29, 31, 37

Question 3

correct option B (14) cao — **B1**

Answer: B) 14

Question 4

correct option B (11) cao — **B1**

Answer: B) 11

Question 5

49 or 25 or 9 etc (a prime square) cao — **B1**

Answer: Example: 49

Question 6

correct option B (137) cao — **B1**

Answer: B) 137

Question 7

correct option D (2^3 x 3 x 5) cao — **B1**

Answer: D) 2^3 x 3 x 5

Question 8

correct option B (36) cao — **B1**

Answer: B) 36

Question 9

correct option C (7) cao — **B1**

Answer: C) 7

Question 10

correct option D (109) cao — **B1**

Answer: D) 109

Question 11

correct option B (5 x 7^2) cao — **B1**

Answer: B) 5 x 7^2

Question 12

correct option C (4) cao — **B1**

Answer: C) 4

Question 13

method seen: $9=3^2$, $12=2^2*3$, $15=3*5$ so LCM = 2^2*3^2*5 — **M1**

180 cao — **A1**

Answer: 180

Question 14

correct option B (120) cao — **B1**

Answer: B) 120

Question 15

correct option B (109) cao — **B1**

Answer: B) 109

Question 16

correct option E (2 x 3^2 x 7) cao — **B1**

Answer: E) 2 x 3^2 x 7

Question 17

correct option C (300) cao — **B1**

Answer: C) 300

Question 18

correct option B (3) cao — **B1**

Answer: B) 3

Question 19

24 cao — **B1**

Answer: 24

Question 20

correct option E (42) cao — **B1**

Answer: E) 42

Question 21

correct option C (101) cao — **B1**

Answer: C) 101

Question 22

correct option B (3^3 x 7) cao — **B1**

Answer: B) 3^3 x 7

Question 23

correct option C (42) cao — **B1**

Answer: C) 42

Question 24

correct option B (4) cao — **B1**

Answer: B) 4

Question 25

correct option D (127) cao — **B1**

Answer: D) 127

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Question 26

correct option D (2^2 x 3^2 x 7) cao **B1**

Answer: D) 2^2 x 3^2 x 7

Question 27

correct option B (4) cao **B1**

Answer: B) 4

Question 28

correct option A (150) cao **B1**

Answer: A) 150

Question 29

correct option C (60) cao **B1**

Answer: C) 60

Question 30

correct option E (20) cao **B1**

Answer: E) 20

Question 31

correct option D (210) cao **B1**

Answer: D) 210

Question 32

correct option C (4) cao **B1**

Answer: C) 4

Question 33

correct option B (37) cao **B1**

Answer: B) 37

Question 34

correct option A (89) cao **B1**

Answer: A) 89

Question 35

correct option B (71) cao **B1**

Answer: B) 71

Question 36

correct option E (12) cao **B1**

Answer: E) 12

Question 37

correct option B (210) cao **B1**

Answer: B) 210

Question 38

correct option A (12) cao **B1**

Answer: A) 12

Question 39

correct option E (5) cao **B1**

Answer: E) 5

Question 40

correct option C (6) cao **B1**

Answer: C) 6

Question 41

correct option E (8) cao **B1**

Answer: E) 8

Question 42

correct option B (17) cao **B1**

Answer: B) 17

Question 43

correct option E (2^2 x 3 x 7) cao **B1**

Answer: E) 2^2 x 3 x 7

Question 44

correct option A (350) cao **B1**

Answer: A) 350

Question 45

correct option D (37) cao **B1**

Answer: D) 37

Question 46

correct option E (3^3 x 5) cao **B1**

Answer: E) 3^3 x 5

Question 47

correct option E (30) cao **B1**

Answer: E) 30

Question 48

correct option E (47) cao **B1**

Answer: E) 47

Question 49

correct option D (2^3 x 3 x 5^2) cao **B1**

Answer: D) 2^3 x 3 x 5^2

Question 50

correct option C (12) cao **B1**

Answer: C) 12

Question 51

correct option B (67) cao **B1**

Answer: B) 67

Question 52

correct option B (2^2 x 7^2) cao **B1**

Answer: B) 2^2 x 7^2

Question 53

correct option D (200) cao **B1**

Answer: D) 200

Question 54

correct option D (4) cao **B1**

Answer: D) 4

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Question 55

prime factor method seen: $72 = 2^3 * 3^2$ or equivalent **M1**

12 cao **A1**

Answer: 12

Question 56

correct option E (75) cao **B1**

Answer: E) 75

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