1.11 Factors and Multiples: 2-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 120 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Here is a list of numbers: 31, 32, 48, 30, 36, 49. From the list, write down (a) the multiples of 10, (b) the multiples of 6. If there are none, write none.

(Total for Question 1 is 2 marks)

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2 Write down all the factors of 30.

(Total for Question 2 is 2 marks)

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3 Write down all the prime numbers between 32 and 47 inclusive. If there is none, write none.

(Total for Question 3 is 2 marks)

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4 Bus A leaves the station every 8 minutes. Bus B leaves the station every 6 minutes. They both leave at 9:00 am. After how many minutes do they next leave together?

(Total for Question 4 is 3 marks)

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5 Write down all the factors of 12.

(Total for Question 5 is 2 marks)

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6 Here is a list of numbers: 16, 37, 34, 58, 33, 15. From the list, write down (a) the multiples of 4, (b) the multiples of 8. If there are none, write none.

(Total for Question 6 is 2 marks)

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7 Write down all the factors of 36.

(Total for Question 7 is 2 marks)

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8 Write down all the prime numbers between 59 and 76 inclusive. If there is none, write none.

(Total for Question 8 is 2 marks)

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9 Bus A leaves the station every 15 minutes. Bus B leaves the station every 9 minutes. They both leave at 9:00 am. After how many minutes do they next leave together?

(Total for Question 9 is 3 marks)

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10 Here is a list of numbers: 52, 14, 54, 27, 12, 33. From the list, write down (a) the multiples of 12, (b) the multiples of 2. If there are none, write none.

(Total for Question 10 is 2 marks)

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11 Write down all the factors of 28.

(Total for Question 11 is 2 marks)

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12 Write down all the prime numbers between 41 and 58 inclusive. If there is none, write none.

(Total for Question 12 is 2 marks)

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13 Write down all the factors of 54.

(Total for Question 13 is 2 marks)

---

14 Write down all the prime numbers between 43 and 61 inclusive. If there is none, write none.

(Total for Question 14 is 2 marks)

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15 Here is a list of numbers.
14, 18, 21, 25, 28, 33, 36, 40
Write down all the multiples of 7 from the list.

(Total for Question 15 is 2 marks)

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16 Write down all the factor pairs of 32.

(Total for Question 16 is 2 marks)

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17 Here is a list of numbers.
1, 2, 4, 6, 8, 9, 11, 13, 16, 27

(a) From the list, write down all the prime numbers. **(2)**

.....

(b) From the list, write down all the cube numbers. **(1)**

.....

(Total for Question 17 is 3 marks)

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18 A list of numbers is shown below.
9, 15, 20, 30, 33, 40
Circle the two numbers that are common multiples of 3 and 5.

(Total for Question 18 is 2 marks)

---

19 Write down all the factors of 24.

(Total for Question 19 is 1 mark)

---

20 Write down the first five multiples of 7 that are less than 40.

(Total for Question 20 is 1 mark)

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21 Write down all the even factors of 60.

(Total for Question 21 is 1 mark)

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22 Work out the smallest multiple of 11 that is greater than 100.

(Total for Question 22 is 1 mark)

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23 Chidi is finding the Highest Common Factor of 16 and 40.
His working is shown below.
Factors of 16: 1, 2, 4, 8, 16
Factors of 40: 1, 2, 4, 5, 8, 10, 20, 40
Common factors: 1, 2, 4, 8
Chidi writes: 'The Highest Common Factor of 16 and 40 is 4.'
Explain the mistake Chidi has made, and write down the correct Highest Common Factor.

Working
Factors of 16: 1, 2, 4, 8, 16
Factors of 40: 1, 2, 4, 5, 8, 10, 20, 40
Common factors: 1, 2, 4, 8
Chidi writes: 'The Highest Common Factor of 16 and 40 is 4.'

(Total for Question 23 is 2 marks)

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24 Neha runs a flower stall and has 42 tulips and 63 daffodils to arrange. She wants to make identical bunches, using every flower, with none left over. Work out the greatest number of identical bunches she can make.

(Total for Question 24 is 3 marks)

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25 Anil waters his tomato plants every 18 days and waters his rose bushes every 24 days. He waters both on the same day today. Work out in how many days' time he will next water both the tomato plants and the rose bushes on the same day.

(Total for Question 25 is 3 marks)

---

26 Show that 123456 is divisible by 3.

(Total for Question 26 is 2 marks)

---

27 Work out the highest common factor (HCF) of 42 and 56.

(Total for Question 27 is 2 marks)

---

28 Work out the least common multiple (LCM) of 6 and 15.

(Total for Question 28 is 2 marks)

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29 Given that the highest common factor (HCF) of 9 and 12 is 3, work out the lowest common multiple (LCM) of 9 and 12.

(Total for Question 29 is 2 marks)

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30 Show that $108 = 2^2 \times 3^3$.

(Total for Question 30 is 2 marks)

---

31 Three bells ring together at 12:00 noon. Bell A rings every 6 minutes. Bell B rings every 8 minutes. Bell C rings every 10 minutes. Work out the next time after 12:00 noon that all three bells ring together.

(Total for Question 31 is 3 marks)

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32 Amara, Tomasz and Ffion go jogging together and set off at the same time from the start of a park route. Amara completes a lap every 8 minutes. Tomasz completes a lap every 12 minutes. Ffion completes a lap every 20 minutes. Work out how many minutes after setting off all three will next be at the start together.

(Total for Question 32 is 3 marks)

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33 Work out the least common multiple of 14, 21 and 35.

(Total for Question 33 is 2 marks)

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34 Work out the smallest 3-digit integer that is divisible by both 11 and 13.

(Total for Question 34 is 1 mark)

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35 The Year 7 class has football training every 5 days and the Year 8 class every 7 days. If both classes have training on Monday, after how many days will they next have training on the same day?

(Total for Question 35 is 2 marks)

---

36 Work out the smallest positive integer that is a multiple of 4, 6 and 9.

(Total for Question 36 is 2 marks)

---

37 Sam and Aisha practise the same music piece in cycles. Sam repeats it every 8 days, Aisha every 12 days. If they both practise today, after how many days will they next practise together?

(Total for Question 37 is 2 marks)

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38 Show that 41472 is divisible by 8.

(Total for Question 38 is 2 marks)

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39 Paper cups are sold in packs of 15. Paper plates are sold in packs of 40. Priya wants to buy exactly the same number of cups as plates for a party, with none left over. Work out the smallest number of cups (and the smallest number of plates) she could buy.

(Total for Question 39 is 2 marks)

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40 Three warning lights flash at regular intervals: the red light every 15 seconds, the amber light every 20 seconds and the green light every 24 seconds. All three flash together at exactly 9:00:00 am. Work out the time when all three will next flash together.

(Total for Question 40 is 2 marks)

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41 A gardener has 96 tulip bulbs and 72 daffodil bulbs. She wants to plant them in rows, with the same number of bulbs in every row, using only one type of bulb per row and no bulbs left over. Work out the greatest possible number of bulbs in each row.

(Total for Question 41 is 2 marks)

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42 Two positive integers have HCF 6 and LCM 84. Work out the product of the two integers.

(Total for Question 42 is 2 marks)

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43 Two positive integers have HCF 8 and LCM 240. One of the integers is 48. Work out the other integer.

(Total for Question 43 is 3 marks)

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Mark scheme · 1.11 Factors and Multiples: 2-hour Pack

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

Question 1

multiples of 10 correct **B1**
multiples of 6 correct **B1**
Answer: multiples of 10: 30; multiples of 6: 48, 30, 36

Question 2

at least half of the factors listed, or factor pairs seen **M1**
all factors, no extras **A1**
Answer: 1, 2, 3, 5, 6, 10, 15, 30

Question 3

tests numbers for factors other than 1 and itself **M1**
all primes and no others **A1**
Answer: 37, 41, 43, 47

Question 4

lists multiples of 8 and 6 **M1**
identifies a common multiple **M1**
24 minutes cao **A1**
Answer: 24 minutes

Question 5

at least half of the factors listed, or factor pairs seen **M1**
all factors, no extras **A1**
Answer: 1, 2, 3, 4, 6, 12

Question 6

multiples of 4 correct **B1**
multiples of 8 correct **B1**
Answer: multiples of 4: 16; multiples of 8: 16

Question 7

at least half of the factors listed, or factor pairs seen **M1**
all factors, no extras **A1**
Answer: 1, 2, 3, 4, 6, 9, 12, 18, 36

Question 8

tests numbers for factors other than 1 and itself **M1**
all primes and no others **A1**
Answer: 59, 61, 67, 71, 73

Question 9

lists multiples of 15 and 9 **M1**
identifies a common multiple **M1**
45 minutes cao **A1**
Answer: 45 minutes

Question 10

multiples of 12 correct **B1**
multiples of 2 correct **B1**
Answer: multiples of 12: 12; multiples of 2: 52, 14, 54, 12

Question 11

at least half of the factors listed, or factor pairs seen **M1**
all factors, no extras **A1**
Answer: 1, 2, 4, 7, 14, 28

Question 12

tests numbers for factors other than 1 and itself **M1**
all primes and no others **A1**
Answer: 41, 43, 47, 53

Question 13

at least half of the factors listed, or factor pairs seen **M1**
all factors, no extras **A1**
Answer: 1, 2, 3, 6, 9, 18, 27, 54

Question 14

tests numbers for factors other than 1 and itself **M1**
all primes and no others **A1**
Answer: 43, 47, 53, 59, 61

Question 15

at least two correct multiples identified, with no more than one non-multiple included **B1**
fully correct set 14, 21, 28 cao **B1**
Answer: 14, 21, 28

Question 16

at least 2 correct factor pairs identified **B1**
fully correct set (1,32), (2,16), (4,8) with no extra pairs, oe order **B1**
Answer: (1, 32), (2, 16), (4, 8)

Question 17

(a) at least 2 correct primes with no more than 1 non-prime included **B1**
(a) fully correct set 2, 11, 13 cao **B1**
(a) Answer: 2, 11, 13
(b) 1, 8 and 27 cao, all three values with no extras **B1**
(b) Answer: 1, 8, 27

Question 18

15 identified **B1**
30 identified, with no incorrect extra numbers circled **B1**
Answer: 15 and 30

Question 19

All factors listed: 1, 2, 3, 4, 6, 8, 12, 24 cao **B1**
Answer: 1, 2, 3, 4, 6, 8, 12, 24 (any order accepted)

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Question 20

Multiples: 7, 14, 21, 28, 35 cao **B1**

Answer: 7, 14, 21, 28, 35

Question 21

All even factors listed: 2, 4, 6, 10, 12, 20, 30, 60 cao **B1**

Answer: 2, 4, 6, 10, 12, 20, 30, 60 (any order accepted)

Question 22

110 cao **B1**

Answer: 110

Question 23

identifies that Chidi has not chosen the highest number from his own list of common factors (he wrote 4 instead of 8), oe **B1**

8 cao **B1**

Answer: Chidi's factors and common factors (1, 2, 4, 8) are correct, but he has not picked the highest of these - the Highest Common Factor is 8, not 4.

Question 24

identifying that the HCF of 42 and 63 is required **M1**

correct factors of 42 (1,2,3,6,7,14,21,42) and 63 (1,3,7,9,21,63) or other valid method **M1**

21 cao **A1**

Answer: 21 bunches

Question 25

identifying that the LCM of 18 and 24 is required **M1**

correct multiples of 18 (18,36,54,72) and 24 (24,48,72) or other valid method **M1**

72 days cao **A1**

Answer: 72 days

Question 26

Use digit sum method: 1+2+3+4+5+6 = 21 **M1**

Therefore 123456 is divisible by 3 cso **A1**

Answer: Digits sum to 21 and 21 is divisible by 3, so 123456 is divisible by 3.

Question 27

Correct method: list common factors or prime factorisation (e.g. 42 = 2*3*7, 56 = 2^3*7) or explicit common factors **M1**

14 cao **A1**

Answer: 14

Question 28

Correct method: prime factors or listing multiples (6 = 2*3, 15 = 3*5 so LCM = 2*3*5) **M1**

30 cao **A1**

Answer: 30

Question 29

Uses the relationship LCM = (9 x 12) / HCF (oe) **M1**

36 cao **A1**

Answer: 36

Question 30

Correct factor tree or repeated division shown (e.g. 108 / 2 = 54, 54 / 2 = 27, 27 / 3 = 9, 9 / 3 = 3) **M1**

2^2 x 3^3 = 4 x 27 = 108, so shown cso **A1**

Answer: Shown: 108 = 2^2 x 3^3, since 2^2 x 3^3 = 4 x 27 = 108.

Question 31

identifying that the LCM of 6, 8 and 10 is required **M1**

correct method leading to LCM=120, e.g. multiples of 6, 8 and 10 up to 120, or prime factors 6=2x3, 8=2^3, 10=2x5 giving 2^3x3x5=120 **M1**

2:00 pm cao (ft their correct 120 minutes converted to a time) **A1**

Answer: 2:00 pm

Question 32

identifying that the LCM of 8, 12 and 20 is required **M1**

correct method leading to LCM=120, e.g. multiples of 8, 12 and 20 up to 120, or prime factors 8=2^3, 12=2^2x3, 20=2^2x5 giving 2^3x3x5=120 **M1**

120 minutes cao **A1**

Answer: 120 minutes

Question 33

Correct method: prime factors (14 = 2*7, 21 = 3*7, 35 = 5*7) and combine **M1**

210 cao **A1**

Answer: 210

Question 34

143 cao **B1**

Answer: 143

Question 35

Find LCM of 5 and 7 (method shown) **M1**

35 days cao **A1**

Answer: 35 days

Question 36

Correct method: prime factors or pairwise LCMs (4 = 2^2, 6 = 2*3, 9 = 3^2 so LCM = 2^2 * 3^2) **M1**

36 cao **A1**

Answer: 36

Question 37

Find LCM of 8 and 12 (method shown) **M1**

24 days cao **A1**

Answer: 24 days

Question 38

Uses the divisibility test for 8: a number is divisible by 8 if its last three digits are divisible by 8, and identifies the last three digits as 472 **M1**

472 = 8 x 59, so 41472 is divisible by 8 cso **A1**

Answer: 41472 is divisible by 8, since its last three digits (472) equal 8 x 59.

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Question 39

Finds LCM of 15 and 40 (method shown)	**M1**
120 cao	**A1**

Answer: 120 cups and 120 plates

Question 40

Finds LCM of 15, 20 and 24 (method shown)	**M1**
9:02:00 am cao (accept 120 seconds or 2 minutes after 9:00:00 am)	**A1**

Answer: 9:02:00 am (120 seconds later)

Question 41

Correct method to find HCF of 96 and 72 (e.g. prime factors or repeated subtraction)	**M1**
24 cao	**A1**

Answer: 24 bulbs per row

Question 42

Use property: product = HCF * LCM for two integers	**M1**
504 cao	**A1**

Answer: 504

Question 43

Uses the property that the product of two integers equals HCF x LCM (oe)	**M1**
Substitutes to find the other integer = (8 x 240) / 48 (oe)	**M1**
40 cao	**A1**

Answer: 40

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