1.6 Factors, Multiples, HCF and LCM: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Reasoning with common multiples in a scheduling context.

(a) Buses on route A arrive every 12 minutes and buses on route B arrive every 18 minutes. If both buses arrive at 09:00, at what times will both buses arrive together before 10:00? Show your working. **(3)**

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2 Write down all the factors of 130.

(2)

3 Find the highest common factor (HCF) of 117 and 108.

(3)

4 Write down all the factors of 100.

(2)

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5 A red light flashes every 10 seconds and a blue light flashes every 12 seconds. They flash together at the start. After how many seconds do they next flash together?

(3)

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6 Find the highest common factor (HCF) of 28 and 12.

(3)

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7 Write down all the factors of 68.

(2)

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8 Write down all the prime numbers that are greater than 58 and less than 72.

(2)

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9 A shop has 72 red pens and 36 blue pens. They are put into identical packs with no pens left over. Each pack has the same number of red pens and the same number of blue pens. What is the greatest number of packs that can be made?

(3)

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10 Find the lowest common multiple (LCM) of 10 and 12.

(3)

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11 Write down all the factors of 132.

(2)

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12 Find the highest common factor (HCF) of 21 and 49.

(3)

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13 Write 231 as a product of its prime factors. Give your answer in index form where possible.

(3)

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14 List all the factors of 24.

(1)

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15 Find the HCF of 42 and 56.

(2)

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16 Is this statement true or false? "Every multiple of 8 is also a multiple of 4." Give a reason for your answer.

(2)

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17 A chess club meets every 8 days and an art club meets every 10 days. Both clubs meet today. In how many days will both clubs next meet on the same day? Show your working.

(3)

---

18 Explain why the sum of two multiples of 5 is always a multiple of 5. Use algebra in your explanation.

(3)

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19 Write 20 as a product of its prime factors.

(1)

20 Use prime factorisation to find the HCF of 24 and 36.

(2)

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Mark scheme · 1.6 Factors, Multiples, HCF and LCM: 1-hour Pack

Question 1

(a) use LCM of 12 and 18 or list common multiples **M1**

(a) LCM = 36 minutes shown **M1**

(a) both arrive together at 09:36 and 10:12 but before 10:00 only 09:36 cao **A1**

(a) Answer: **09:36 (both arrive together before 10:00)**

Question 2

at least half of the factors correct, with no more than one incorrect value **M1**

1, 2, 5, 10, 13, 26, 65, 130 cao **A1**

Answer: **1, 2, 5, 10, 13, 26, 65, 130**

Question 3

factors of 117 or 108 listed (or prime factorisation attempted) **M1**

common factors or common prime factors identified **M1**

9 cao **A1**

Answer: **9**

Question 4

at least half of the factors correct, with no more than one incorrect value **M1**

1, 2, 4, 5, 10, 20, 25, 50, 100 cao **A1**

Answer: **1, 2, 4, 5, 10, 20, 25, 50, 100**

Question 5

lists multiples of both numbers or uses prime factors **M1**

identifies a common multiple **M1**

60 (seconds) cao **A1**

Answer: **60 seconds**

Question 6

factors of 28 or 12 listed (or prime factorisation attempted) **M1**

common factors or common prime factors identified **M1**

4 cao **A1**

Answer: **4**

Question 7

at least half of the factors correct, with no more than one incorrect value **M1**

1, 2, 4, 17, 34, 68 cao **A1**

Answer: **1, 2, 4, 17, 34, 68**

Question 8

tests numbers for factors other than 1 and themselves, or lists at least one correct prime **M1**

59, 61, 67, 71 cao **A1**

Answer: **59, 61, 67, 71**

Question 9

identifies HCF as the method **M1**

common factors of 72 and 36 found **M1**

36 cao **A1**

Answer: **36**

Question 10

multiples of 10 or 12 listed, or prime factors found **M1**

a common multiple identified **M1**

60 cao **A1**

Answer: **60**

Question 11

at least half of the factors correct, with no more than one incorrect value **M1**

1, 2, 3, 4, 6, 11, 12, 22, 33, 44, 66, 132 cao **A1**

Answer: **1, 2, 3, 4, 6, 11, 12, 22, 33, 44, 66, 132**

Question 12

factors of 21 or 49 listed (or prime factorisation attempted) **M1**

common factors or common prime factors identified **M1**

7 cao **A1**

Answer: **7**

Question 13

a factor tree or repeated division by primes started correctly, eg 231 = 3 x 77 **M1**

all prime factors found: 3 x 7 x 11 **M1**

3 x 7 x 11 cao **A1**

Answer: **3 x 7 x 11**

Question 14

1, 2, 3, 4, 6, 8, 12, 24 all correct **B1**

Answer: **1, 2, 3, 4, 6, 8, 12, 24**

Question 15

correct prime factorisations 42 = 2 x 3 x 7 and 56 = 2^3 x 7 (or equivalent method) **M1**

14 cao **A1**

Answer: **14**

Question 16

correct answer, true **B1**

valid reason, e.g. 8 = 4 x 2, so any multiple of 8 is 4 x (2 x k), which is a multiple of 4 **B1**

Answer: **True**

Question 17

correct prime factorisations 8 = 2^3 and 10 = 2 x 5 (or equivalent method) **M1**

correctly combines to LCM = 2^3 x 5 **M1**

40 cao **A1**

Answer: **40 days**

Question 18

writes the two multiples as 5m and 5n for integers m, n **M1**

correctly sums to 5m + 5n = 5(m + n) **M1**

correct conclusion that 5(m+n) is a multiple of 5 since m+n is an integer **A1**

Answer: **5m + 5n = 5(m + n), which is a multiple of 5, so the sum of two multiples of 5 is always a multiple of 5.**

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Question 19

2^2 x 5 cao	**B1**

Answer: **2^2 x 5**

Question 20

correct prime factorisations 24 = 2^3 x 3 and 36 = 2^2 x 3^2 (or equivalent method)	**M1**
12 cao	**A1**

Answer: **12**

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