1.6 Factors, Multiples, HCF and LCM: 2-hour Pack

Calculators not allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Find the highest common factor (HCF) of 60 and 50.

(3)

2 Write down all the factors of 124.

(2)

3 Write down the first two common multiples of 4 and 6.

(2)

4 Write down all the factors of 66.

(2)

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5 Use prime factorisation to find the highest common factor (HCF).

(a) Find the HCF of 12 and 18 using prime factors. **(2)**

.....

6 Write down all the prime numbers that are greater than 7 and less than 21.

(2)

7 A shop has 27 red pens and 12 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)

8 Write down the first two common multiples of 9 and 10.

(2)

9 Write down all the factors of 108.

(2)

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10 Write down the first two common multiples of 3 and 5.

(2)

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11 Find the highest common factor (HCF) of 10 and 50.

(3)

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12 Write down the first two common multiples of 3 and 4.

(2)

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13 Write down all the factors of 110.

(2)

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14 A shop has 80 red pens and 72 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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15 Find the highest common factor (HCF) of 77 and 91.

(3)

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16 Find the highest common factor (HCF) by listing factors.

(a) Find the HCF of 16 and 24 by listing factors. **(2)**

.....

(b) Find the HCF of 14 and 35 by listing factors. **(1)**

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17 Write down all the prime numbers that are greater than 34 and less than 54.

(2)

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18 A shop has 160 red pens and 72 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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19 Write down all the prime numbers that are greater than 54 and less than 75.

(2)

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20 Write down all the prime numbers that are greater than 25 and less than 42.

(2)

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21 Find the highest common factor (HCF) of 8 and 24.

(3)

---

22 Write down the first two common multiples of 10 and 8.

(2)

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23 A shop has 80 red pens and 40 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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24 Find the lowest common multiple (LCM) of 9 and 8.

(3)

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25 Find the lowest common multiple (LCM) by listing multiples.

(a) Find the LCM of 4 and 6 by listing multiples. **(2)**

.....

26 Write down all the prime numbers that are greater than 32 and less than 48.

(2)

27 A shop has 45 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)

28 Write 88 as a product of its prime factors. Give your answer in index form where possible.

(3)

29 Find the highest common factor (HCF) of 36 and 63.

(3)

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30 Write down the first two common multiples of 3 and 6.

(2)

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31 A red light flashes every 6 seconds and a blue light flashes every 4 seconds. They flash together at the start. After how many seconds do they next flash together?

(3)

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32 Write down all the prime numbers that are greater than 18 and less than 33.

(2)

---

33 Find the lowest common multiple (LCM) of 4 and 24.

(3)

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34 Use prime factorisation to find the lowest common multiple (LCM).

(a) Find the LCM of 8 and 12 using prime factors. **(3)**

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35 Find the LCM of 9 and 12 by listing multiples of each.

(1)

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36 Three delivery vans leave a warehouse together. Van A leaves every 12 minutes, Van B every 18 minutes and Van C every 24 minutes. If all three leave together at 09:00, after how many minutes will they next all leave together? Show your working.

(3)

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37 Two numbers have HCF 8 and LCM 96. One of the numbers is 24. Find the other number. Show your working.

(3)

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38 A gardener waters flower bed A every 15 days and flower bed B every 20 days. She waters both beds today. Over the next 100 days (not counting today), how many more times will she water both beds on the same day? Show your working.

(3)

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Mark scheme · 1.6 Factors, Multiples, HCF and LCM: 2-hour Pack

Question 1

factors of 60 or 50 listed (or prime factorisation attempted)	M1
common factors or common prime factors identified	M1
10 cao	A1

Answer: **10**

Question 2

at least half of the factors correct, with no more than one incorrect value	M1
1, 2, 4, 31, 62, 124 cao	A1

Answer: **1, 2, 4, 31, 62, 124**

Question 3

multiples of 4 and 6 listed or LCM = 12 found	M1
12, 24 cao	A1

Answer: **12, 24**

Question 4

at least half of the factors correct, with no more than one incorrect value	M1
1, 2, 3, 6, 11, 22, 33, 66 cao	A1

Answer: **1, 2, 3, 6, 11, 22, 33, 66**

Question 5

(a) prime factors: $12 = 2^2 \times 3$, $18 = 2 \times 3^2$ or equivalent	M1
(a) HCF = 6 cao	A1

(a) Answer: **6**

Question 6

tests numbers for factors other than 1 and themselves, or lists at least one correct prime	M1
11, 13, 17, 19 cao	A1

Answer: **11, 13, 17, 19**

Question 7

identifies HCF as the method	M1
common factors of 27 and 12 found	M1
3 cao	A1

Answer: **3**

Question 8

multiples of 9 and 10 listed or LCM = 90 found	M1
90, 180 cao	A1

Answer: **90, 180**

Question 9

at least half of the factors correct, with no more than one incorrect value	M1
1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108 cao	A1

Answer: **1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108**

Question 10

multiples of 3 and 5 listed or LCM = 15 found	M1
15, 30 cao	A1

Answer: **15, 30**

Question 11

factors of 10 or 50 listed (or prime factorisation attempted)	M1
common factors or common prime factors identified	M1
10 cao	A1

Answer: **10**

Question 12

multiples of 3 and 4 listed or LCM = 12 found	M1
12, 24 cao	A1

Answer: **12, 24**

Question 13

at least half of the factors correct, with no more than one incorrect value	M1
1, 2, 5, 10, 11, 22, 55, 110 cao	A1

Answer: **1, 2, 5, 10, 11, 22, 55, 110**

Question 14

identifies HCF as the method	M1
common factors of 80 and 72 found	M1
8 cao	A1

Answer: **8**

Question 15

factors of 77 or 91 listed (or prime factorisation attempted)	M1
common factors or common prime factors identified	M1
7 cao	A1

Answer: **7**

Question 16

(a) correct listing of factors for both numbers, e.g. 16:1,2,4,8,16 and 24:1,2,3,4,6,8,12,24	M1
(a) HCF = 8 cao	A1

(a) Answer: **8**

(b) HCF = 7 cao	B1

(b) Answer: **7**

Question 17

tests numbers for factors other than 1 and themselves, or lists at least one correct prime	M1
37, 41, 43, 47, 53 cao	A1

Answer: **37, 41, 43, 47, 53**

Question 18

identifies HCF as the method	M1
common factors of 160 and 72 found	M1
8 cao	A1

Answer: **8**

Question 19

tests numbers for factors other than 1 and themselves, or lists at least one correct prime	M1
59, 61, 67, 71, 73 cao	A1

Answer: **59, 61, 67, 71, 73**

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Question 20

tests numbers for factors other than 1 and themselves, or lists at least one correct prime	M1
29, 31, 37, 41 cao	A1

Answer: **29, 31, 37, 41**

Question 21

factors of 8 or 24 listed (or prime factorisation attempted)	M1
common factors or common prime factors identified	M1
8 cao	A1

Answer: **8**

Question 22

multiples of 10 and 8 listed or LCM = 40 found	M1
40, 80 cao	A1

Answer: **40, 80**

Question 23

identifies HCF as the method	M1
common factors of 80 and 40 found	M1
40 cao	A1

Answer: **40**

Question 24

multiples of 9 or 8 listed, or prime factors found	M1
a common multiple identified	M1
72 cao	A1

Answer: **72**

Question 25

(a) multiples listed correctly for at least one number and common multiple identified	M1
(a) LCM = 12 cao	A1

(a) Answer: **12**

Question 26

tests numbers for factors other than 1 and themselves, or lists at least one correct prime	M1
37, 41, 43, 47 cao	A1

Answer: **37, 41, 43, 47**

Question 27

identifies HCF as the method	M1
common factors of 45 and 36 found	M1
9 cao	A1

Answer: **9**

Question 28

a factor tree or repeated division by primes started correctly, eg 88 = 2 x 44	M1
all prime factors found: 2 x 2 x 2 x 11	M1
2^3 x 11 cao	A1

Answer: **2^3 x 11**

Question 29

factors of 36 or 63 listed (or prime factorisation attempted)	M1
common factors or common prime factors identified	M1
9 cao	A1

Answer: **9**

Question 30

multiples of 3 and 6 listed or LCM = 6 found	M1
6, 12 cao	A1

Answer: **6, 12**

Question 31

lists multiples of both numbers or uses prime factors	M1
identifies a common multiple	M1
12 (seconds) cao	A1

Answer: **12 seconds**

Question 32

tests numbers for factors other than 1 and themselves, or lists at least one correct prime	M1
19, 23, 29, 31 cao	A1

Answer: **19, 23, 29, 31**

Question 33

multiples of 4 or 24 listed, or prime factors found	M1
a common multiple identified	M1
24 cao	A1

Answer: **24**

Question 34

(a) prime factors: 8 = 2^3, 12 = 2^2 x 3 identified	M1
(a) take highest powers: 2^3 and 3	M1
(a) LCM = 24 cao	A1

(a) Answer: **24**

Question 35

36 cao	B1

Answer: **36**

Question 36

correct prime factorisations 12 = 2^2 x 3, 18 = 2 x 3^2 and 24 = 2^3 x 3 (or equivalent method)	M1
correctly combines to LCM = 2^3 x 3^2	M1
72 cao	A1

Answer: **72 minutes**

Question 37

uses HCF x LCM = product of the two numbers, 8 x 96 = 768	M1
divides by the known number, 768 / 24	M1
32 cao	A1

Answer: **32**

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Question 38

correct prime factorisations $15 = 3 \times 5$ and $20 = 2^2 \times 5$ (or equivalent method)	**M1**
correctly combines to LCM = 60, and identifies multiples of 60 up to 100 (only 60)	**M1**
1 (once, on day 60) cao	**A1**

Answer: **1 more time (on day 60)**

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