1.6 Factors, Multiples, HCF and LCM: Test Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write down all the factors of each number.

(a) Write down all the factors of 12. **(1)**

(b) Write down all the factors of 15. **(1)**

(c) Write down all the factors of 9. **(1)**

(d) Write down all the factors of 20. **(1)**

2 Find prime factors and use them to decide divisibility.

(a) Is 390 divisible by 5 and by 13? Use prime factors to justify your answer. **(3)**

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3 Stretch: multi-step problem using HCF and LCM.

(a) Three lights flash every 6 seconds, 10 seconds and 15 seconds respectively. After how many seconds will they next flash together? Show your working. **(4)**

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4 Stretch: reasoning with prime factors in context.

(a) Explain why the product of two consecutive integers is always even. Use factors and primes in your explanation. **(3)**

5 State whether each number is a multiple of 7. Write yes or no.

(a) Is 42 a multiple of 7? **(1)**

(b) Is 50 a multiple of 7? **(1)**

6 A shop has 60 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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7 Write 234 as a product of its prime factors. Give your answer in index form where possible.

(3)

8 Write down all the prime numbers that are greater than 68 and less than 80.

(2)

9 Decide whether each statement is true or false. Tick the correct box.

(a) If a divides b, then a is a factor of b. True or false? **(1)**

(b) All prime numbers are odd. True or false? **(1)**

10 Use a Venn diagram to find the HCF and LCM.

(a) Use a Venn diagram to show the prime factors of 30 and 45. Then find the HCF and LCM. **(4)**

11 List the first three common multiples of 3 and 4.

(2)

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12 Write 50 as a product of its prime factors.

(1)

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13 A baker has 60 cupcakes and 84 cookies. She wants to pack them into identical boxes so that each box has the same number of cupcakes and the same number of cookies, with none left over. What is the greatest number of boxes she can pack? Show your working.

(3)

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14 Is 84 a multiple of 6? Write yes or no and show a check.

(1)

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15 Find the highest common factor (HCF) of 20 and 30 by listing the factors of each number.

(2)

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16 Use prime factorisation to find the LCM of 6 and 14.

(2)

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17 Is 17 a prime number? Explain your answer by checking for factors.

(2)

18 Find the two whole numbers strictly between 50 and 100 that are multiples of both 4 and 5.

(2)

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Mark scheme · 1.6 Factors, Multiples, HCF and LCM: Test Pack

Question 1

(a) 1, 2, 3, 4, 6, 12 cao — **B1**

(a) Answer: **1, 2, 3, 4, 6, 12**

(b) 1, 3, 5, 15 cao — **B1**

(b) Answer: **1, 3, 5, 15**

(c) 1, 3, 9 cao — **B1**

(c) Answer: **1, 3, 9**

(d) 1, 2, 4, 5, 10, 20 cao — **B1**

(d) Answer: **1, 2, 4, 5, 10, 20**

Question 2

(a) prime factorisation 390 = 39 x 10 = (3 x 13) x (2 x 5) identified — **M1**

(a) show 5 and 13 appear in factorisation — **M1**

(a) answer: divisible by both 5 and 13 cao — **A1**

(a) Answer: **Divisible by both 5 and 13**

Question 3

(a) recognition to use LCM of 6,10,15 — **M1**

(a) prime factors: 6=2x3, 10=2x5, 15=3x5 or equivalent — **M1**

(a) take highest powers: 2, 3, 5 — **M1**

(a) LCM = 30 so answer 30 seconds cao — **A1**

(a) Answer: **30**

Question 4

(a) state that consecutive integers differ by 1 so one must be even — **M1**

(a) conclude that product includes factor 2 — **M1**

(a) clear explanation that having factor 2 makes product even cao — **A1**

(a) Answer: **Because consecutive integers differ by 1, one of them is even so the product includes a factor 2; therefore the product is even.**

Question 5

(a) Yes; 42 = 7 x 6 cao — **B1**

(a) Answer: **Yes**

(b) No; 50 not divisible by 7 cao — **B1**

(b) Answer: **No**

Question 6

identifies HCF as the method — **M1**

common factors of 60 and 36 found — **M1**

12 cao — **A1**

Answer: **12**

Question 7

a factor tree or repeated division by primes started correctly, eg 234 = 2 x 117 — **M1**

all prime factors found: 2 x 3 x 3 x 13 — **M1**

2 x 3^2 x 13 cao — **A1**

Answer: **2 x 3^2 x 13**

Question 8

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

71, 73, 79 cao — **A1**

Answer: **71, 73, 79**

Question 9

(a) True; definition of factor/divides — **B1**

(a) Answer: **True**

(b) False; 2 is prime and even — **B1**

(b) Answer: **False**

Question 10

(a) correct prime factors placed: 30 = 2 x 3 x 5, 45 = 3 x 3 x 5 with one 3 and one 5 in intersection — **M1**

(a) HCF from Venn diagram: 3 x 5 — **M1**

(a) LCM from Venn diagram: product of all primes 2 x 3 x 3 x 5 or equivalent — **M1**

(a) HCF = 15 and LCM = 90 cao — **A1**

(a) Answer: **HCF = 15; LCM = 90**

Question 11

recognises LCM(3,4) = 12 (or lists multiples of both) — **M1**

12, 24, 36 cao — **A1**

Answer: **12, 24, 36**

Question 12

2 x 5^2 cao — **B1**

Answer: **2 x 5^2**

Question 13

correct prime factorisations 60 = 2^2 x 3 x 5 and 84 = 2^2 x 3 x 7 (or equivalent method) — **M1**

correctly combines to HCF = 2^2 x 3 — **M1**

12 cao — **A1**

Answer: **12 boxes**

Question 14

yes, since 84 = 6 x 14 (or equivalent check) — **B1**

Answer: **Yes**

Question 15

correct factor list for 20 and for 30 (or equivalent method) shown — **M1**

10 cao — **A1**

Answer: **10**

Question 16

correct prime factorisations 6 = 2 x 3 and 14 = 2 x 7 (or equivalent method) — **M1**

42 cao — **A1**

Answer: **42**

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Question 17

correct conclusion that 17 is prime	**B1**
valid reason, e.g. 17 is not divisible by 2 or 3, and no need to check beyond $\sqrt{17}$	**B1**

Answer: **Yes, 17 is prime**

Question 18

recognises LCM(4,5) = 20 (or lists multiples of both 4 and 5)	**M1**
60 and 80 cao	**A1**

Answer: **60 and 80**

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