Finding Common Ground

Standard difficulty · 20 questions · 40 marks · Time: 31 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. The prime factorisation of 225 is:

(a) 3 × 3 × 5 × 5 **(b)** 3 × 3 × 5 × 5 × 2
(c) 9 × 5 × 5 **(d)** 3 × 3 × 5 × 10

2. The HCF of 319 and 290 is:

(a) 29 **(b)** 3190 **(c)** 58 **(d)** 110

3. HCF stands for:

(a) Highest Counting Figure **(b)** Half Common Factor
(c) Highest Common Factor **(d)** Highest Common Fraction

4. The LCM of 5, 9 and 20 is:

(a) 360 **(b)** 900 **(c)** 180 **(d)** 45

5. Which pair of numbers is co-prime?

(a) 42 and 33 **(b)** 18 and 14 **(c)** 24 and 45 **(d)** 28 and 51

6. The HCF of 18 and 21 is 3. Their LCM is:

(a) 126 **(b)** 63 **(c)** 378 **(d)** 39

7. To find the largest tile that fits a floor exactly, we find the:

(a) product of the sides **(b)** sum of the sides
(c) LCM of the sides **(d)** HCF of the sides

8. The greatest number that divides both 117 and 143 exactly is:

(a) 13 **(b)** 117 **(c)** 1287 **(d)** 6

Section B — Short answer — 8 × 2 = 16 marks

9. Write 1512 as a product of prime factors, using powers.

10. Find the HCF of 77 and 70 by prime factorisation.

11. Find the LCM of 9, 20 and 25.

12. Find the HCF of 27, 18 and 99.

13. Two numbers have HCF 14 and LCM 980. One of them is 140. Find the other.

14. Find the smallest 4-digit number that is divisible by both 9 and 6.

15. Are 100 and 145 co-prime? Give a reason.

16. Write 675 and 600 in prime-power form, then find their HCF and LCM.

Section C — Word problems — 4 × 4 = 16 marks

17. Three traffic lights change every 48, 20 and 24 seconds. They change together at 9:00:00 am. When do they next change together?

18. A hall floor is 175 cm by 150 cm. What is the largest square tile that covers it exactly, without cutting? How many tiles are needed?

19. A shop has 221 pens and 136 pencils. It packs them into identical gift packs with nothing left over. What is the largest number of packs, and what goes in each?

20. Ananya runs a lap in 4 minutes and Vikram in 15 minutes. They start together. After how many minutes are they next together at the start, and how many laps has each run?

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Answer key

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Q	Answer	Working
1	**(a) 3 × 3 × 5 × 5**	3 × 3 × 5 × 5 = 225, all prime
2	**(a) 29**	319 = 29 × 11, 290 = 29 × 10
3	**(c) Highest Common Factor**	—
4	**(c) 180**	5, 3^2, $2^2 \times 5$: highest powers give $2^2 \times 3^2 \times 5 = 180$
5	**(d) 28 and 51**	HCF(28, 51) = 1
6	**(a) 126**	HCF × LCM = 18 × 21: 378 ÷ 3 = 126
7	**(d) HCF of the sides**	—
8	**(a) 13**	HCF of 117 and 143
9	**$2^3 \times 3^3 \times 7$**	2 × 2 × 2 × 3 × 3 × 3 × 7 = 1512
10	**7**	7 × 11 and 2 × 5 × 7: common primes give 7 = 7
11	**900**	3^2, $2^2 \times 5$, $5^2 \rightarrow 2^2 \times 3^2 \times 5^2$
12	**9**	each is 9 × a different prime
13	**98**	14 × 980 ÷ 140 = 98
14	**1008**	LCM 18; 18 × 56 = 1008
15	**No, both are divisible by 5**	HCF(100, 145) = 5
16	**$3^3 \times 5^2$, $2^3 \times 3 \times 5^2$; HCF 75, LCM 5400**	HCF: lowest power of each common prime; LCM: highest power of every prime
17	**after 240 seconds, at 9:04:00 am**	LCM of 48, 20 and 24 = 240 s = 4 min 0 s
18	**25 cm; 42 tiles**	HCF = 25; 7 × 6 = 42
19	**17 packs, each with 13 pens and 8 pencils**	HCF(221, 136) = 17
20	**60 minutes; Ananya 15 laps, Vikram 4 laps**	LCM of 4 and 15 = 60

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