Real Numbers

Standard difficulty · 20 questions · 40 marks · Time: 36 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 40 is:
(a) $2^3 \times 5$ **(b)** $2^4 \times 5$ **(c)** $2^3 \times 3 \times 5$ **(d)** $2^2 \times 5$

2. The HCF of 364 and 286 is:
(a) 4004 **(b)** 52 **(c)** 26 **(d)** 154

3. The LCM of 28 and 20 is:
(a) 140 **(b)** 560 **(c)** 4 **(d)** 48

4. The HCF of two numbers is 7 and their LCM is 147. If one number is 49, the other is:
(a) 21 **(b)** 22 **(c)** 147 **(d)** 28

5. Every composite number can be written as a product of primes in:
(a) exactly one way, apart from the order **(b)** no way
(c) many different ways **(d)** exactly two ways

6. The LCM of 4, 25, 21 is:
(a) 2,100 **(b)** 3,100 **(c)** 4,200 **(d)** 6,300

7. The HCF of 45, 120, 165 is:
(a) 45 **(b)** 30 **(c)** 15 **(d)** 1

8. Assertion (A): $\sqrt{121}$ is irrational.
Reason (R): If p is a prime number, then $\sqrt{p}$ is irrational.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

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

9. Find the HCF and LCM of 288 and 396 by prime factorisation.

10. Find the HCF and LCM of 16, 18, 30.

11. Express 33 as a product of its prime factors.

12. Find the HCF and LCM of 130 and 110, and check that HCF × LCM = 130 × 110.

13. Find the smallest number that leaves a remainder of 4 when divided by 12, 15, 6.

14. The LCM of two numbers is 720 and their HCF is 10. One number is 80. Find the other.

15. Is 11 × 5 × 7 + 7 a prime or a composite number? Give a reason.

16. Find the greatest number that divides 135 and 314, leaving remainders 20 and 15 respectively.

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

17. Two bells ring together at 8:00 am. One rings every 36 minutes and the other every 30 minutes. When will they next ring together?

18. A room is 385 cm long and 525 cm wide. Find the side of the largest square tile that fits exactly, and the number of tiles needed.

19. Isha, Asha and Priya start running round a track together. They take 15, 12 and 16 minutes per round. After how many minutes will they all be at the start together again?

20. A sweet seller has 270 kaju barfis and 435 badam barfis. She stacks them so every stack has the same number of one kind, using as few stacks as possible. How many barfis go in each stack?

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Answer key

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Q	Answer	Working
1	**(a) $2^3 \times 5$**	$2^3 \times 5 = 40$
2	**(c) 26**	364 = 26 × 14, 286 = 26 × 11, and 14, 11 share no factor
3	**(a) 140**	LCM = 4 × 7 × 5 = 140
4	**(a) 21**	other = HCF × LCM ÷ 49 = 7 × 147 ÷ 49 = 21
5	**(a) exactly one way, apart from the order**	the Fundamental Theorem of Arithmetic
6	**(a) 2,100**	$4 = 2^2$; $25 = 5^2$; 21 = 3 × 7; take the highest power of each prime
7	**(c) 15**	each is 15 times 3, 8, 11, which share no common factor
8	**(d) A is false, but R is true.**	A is false: √121 = 11, which is rational. R is true.
9	**HCF = 36, LCM = 3,168**	$288 = 2^5 \times 3^2$; $396 = 2^2 \times 3^2 \times 11$; HCF = product of the lowest powers, LCM = the highest
10	**HCF = 2, LCM = 720**	$16 = 2^4$; $18 = 2 \times 3^2$; 30 = 2 × 3 × 5
11	**3 × 11**	divide by primes in turn: 3 × 11
12	**HCF = 10, LCM = 1430; 10 × 1430 = 14,300 = 130 × 110**	130 = 2 × 5 × 13, 110 = 2 × 5 × 11
13	**64**	LCM(12, 15, 6) = 60; 60 + 4 = 64
14	**90**	10 × 720 ÷ 80 = 90
15	**Composite: it equals 7 × 56**	11 × 5 × 7 + 7 = 7 × (11 × 5 + 1) = 7 × 56
16	**23**	HCF(135 − 20, 314 − 15) = HCF(115, 299) = 23
17	**11:00 am**	LCM(36, 30) = 180 minutes after 8:00 am
18	**35 cm; 165 tiles**	HCF(385, 525) = 35; (385 ÷ 35) × (525 ÷ 35) = 165
19	**240 minutes**	LCM(15, 12, 16) = 240
20	**15 barfis**	HCF(270, 435) = 15

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