The World of Algorithms

Standard difficulty · 20 questions · 40 marks · Time: 39 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. An algorithm is:
(a) a type of number
(b) a formula for area
(c) a guess that usually works
(d) a finite list of clear steps that solves a problem

2. Using Euclid's algorithm, HCF(126, 99) is:
(a) 9 **(b)** 27 **(c)** 18 **(d)** 11

3. How many divisions does Euclid's algorithm make to find HCF(88, 12)?
(a) 4 **(b)** 3 **(c)** 1 **(d)** 2

4. Adding 1706 + 7467 column by column, how many carries are made?
(a) 3 **(b)** 0 **(c)** 1 **(d)** 2

5. The first step of Euclid's algorithm for HCF(713, 98) is:
(a) 713 = 98 × 7 + 27 **(b)** 98 = 27 × 7 + 11
(c) 713 = 98 × 8 − 71 **(d)** 713 = 27 × 7 + 98

6. HCF(48, 18) by Euclid: 48 = 18 × 2 + 12, 18 = 12 × 1 + 6, 12 = 6 × 2 + 0. The HCF is:
(a) 18 **(b)** 6 **(c)** 12 **(d)** 2

7. Start with s = 1. Repeat 9 times: double s. The final value of s is:
(a) 1024 **(b)** 521 **(c)** 511 **(d)** 512

8. HCF(54, 24) = 6. Then LCM(54, 24) is:
(a) 108 **(b)** 1296 **(c)** 216 **(d)** 78

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

9. Use Euclid's algorithm to find the HCF of 442 and 416.

10. Find HCF(18, 15) by repeated subtraction (keep replacing the larger number by the difference).

11. Add 9166 + 2907 column by column. Give the sum and the number of carries.

12. Write 118 in binary by repeated division by 2.

13. Start with 19. Repeat: if the number is even, halve it; if odd, multiply by 3 and add 1. How many steps does it take to reach 1?

14. Repeatedly replace 842533 by the sum of its digits until one digit is left. What is it?

15. Find HCF(99, 88, 110) using HCF(HCF(99, 88), 110).

16. Use the sieve of Eratosthenes to list the primes from 35 to 55.

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

17. A floor is 1100 cm by 1000 cm. Find the side of the largest square tile that fits exactly, and the number of tiles needed.

18. Two ropes of 266 m and 57 m are cut into pieces of equal length, as long as possible, with nothing left over. How long is each piece and how many pieces are there?

19. Two bells ring together at 7:00 a.m. One rings every 16 minutes and the other every 20 minutes. When do they next ring together?

20. A shop's billing algorithm: add the prices; if the total is more than Rs 1,800, take 20% off. What is the bill for items costing Rs 140, Rs 350, Rs 190, Rs 590?

Want another sheet on this chapter? In the Ambiful Worksheets app every sheet is new, with its answer key, and your child never gets the same question twice.

Scan the code to get the free app, or open **worksheets.ambiful.com/get**

Answer key

The World of Algorithms · AW-9M-ALG-2026-V1 · For parents — fold back or tear off before handing the sheet to your child.

Q	Answer	Working
1	**(d) a finite list of clear steps that solves a problem**	—
2	**(a) 9**	126 = 99 × 1 + 27; 99 = 27 × 3 + 18; 27 = 18 × 1 + 9; 18 = 9 × 2 + 0
3	**(d) 2**	88 = 12 × 7 + 4; 12 = 4 × 3 + 0
4	**(d) 2**	1706 + 7467 = 9173
5	**(a) 713 = 98 × 7 + 27**	divide the larger number by the smaller
6	**(b) 6**	the last non-zero remainder
7	**(d) 512**	2 multiplied 9 times
8	**(c) 216**	54 × 24 ÷ 6
9	**26**	442 = 416 × 1 + 26; 416 = 26 × 16 + 0
10	**3**	(18, 15) → (3, 15) → (3, 12) → (3, 9) → (3, 6) → (3, 3)
11	**12073; 3 carries**	start from the units column; carry 1 whenever a column makes 10 or more
12	**1110110**	118 ÷ 2 = 59 r 0; 59 ÷ 2 = 29 r 1; 29 ÷ 2 = 14 r 1; 14 ÷ 2 = 7 r 0; 7 ÷ 2 = 3 r 1; 3 ÷ 2 = 1 r 1; 1 ÷ 2 = 0 r 1; read the remainders upwards
13	**20**	19 → 58 → 29 → 88 → 44 → 22 → 11 → 34 → 17 → 52 → 26 → 13 → 40 → 20 → 10 → 5 → 16 → 8 → 4 → 2 → 1
14	**7**	842533 → 25 → 7
15	**11**	HCF(99, 88) = 11; HCF(11, 110) = 11
16	**37, 41, 43, 47, 53**	cross out multiples of 2, 3, 5 and 7 (enough up to 100)
17	**100 cm; 110 tiles**	1100 = 1000 × 1 + 100; 1000 = 100 × 10 + 0; (1100 ÷ 100) × (1000 ÷ 100)
18	**19 m; 17 pieces**	HCF(266, 57) = 19; 266 ÷ 19 + 57 ÷ 19
19	**8:20 a.m.**	LCM(16, 20) = 16 × 20 ÷ HCF 4 = 80 minutes = 1 h 20 min after 7:00
20	**Rs 1,270**	total = Rs 1,270, not more than Rs 1,800, so no discount