

CLASS 9 · HOTS · OLYMPIAD PREPARATION · DPP SHEET

Chapter 11: HOTS: The World of Algorithms (Class 9)

Daily practice problems: 8 questions with an answer key

Try every question on your own first. The answer key is on the last page.

1. Trace this algorithm and give the output: "Start with $a = 84$ and $b = 36$. While $b \neq 0$, replace (a, b) by $(b, a \bmod b)$. Output a ."
2. Find the GCD of 150 and 60 using Euclid's algorithm.
3. An algorithm repeatedly subtracts the smaller number from the larger until the two are equal. Start with 45 and 30 and give the final number.
4. How many divisions does Euclid's method need to find the GCD of 21 and 14?
5. What is the output of the algorithm "start with $s = 0$ and $n = 1$; while $n \leq 5$, set $s = s + n$ and $n = n + 1$; output s "?
6. An algorithm for the sum of two numbers adds them digit by digit from the right with a carry. What is the carry when 8 and 7 are added in the units place?
7. Write the first two steps of an algorithm that finds the largest of three numbers a, b, c .
8. Why must an algorithm always stop after a finite number of steps?

Answer Key

1. 12.
2. 30.
3. 15.
4. 2 divisions ($21 = 1 \times 14 + 7$ and $14 = 2 \times 7 + 0$).
5. 15.
6. The sum is 15, so write 5 and carry 1.
7. One answer: compare a and b and keep the larger as m ; then compare m with c and keep the larger.
8. An algorithm that never stops never gives an answer, so it cannot solve the problem.

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