

Fibonacci Day maths for CBSE Class 10

CBSE Math Revision · CBSE Class 10 (Class 9 can try most of it) · 23 November · Student sheet

Name _____

Class _____

Date _____

No calculator. Where a decimal is wanted, the question gives the value to use.

Starter (5 minutes)

1. Write down the next three terms: 1, 1, 2, 3, 5, 8, ...
2. Find the HCF of 21 and 34.
3. Solve $x^2 - x - 1 = 0$ using the quadratic formula.
4. Find the sum of the first 7 Fibonacci numbers and compare it with the 9th.

Main activity (35 minutes)

Task A: Fibonacci-type puzzles

In a Fibonacci-type sequence you choose the first two terms; after that, each term is the sum of the two before it.

- a. The first two terms are 3 and 7. Find the 8th term.
- b. A number trick: the sum of the first 10 terms of any Fibonacci-type sequence is 11 times the 7th term. Using first terms a and b , prove it. Then find the sum of the first 10 terms of the sequence in part (a) in one step.
- c. A Fibonacci-type sequence has 3rd term 12 and 6th term 50. Find the first two terms.

Task B: Euclid's division algorithm

Use $a = bq + r$, $0 \leq r < b$, again and again until the remainder is 0.

- a. Find HCF(144, 89) using Euclid's division algorithm, and count the division steps. What do you notice about the remainders?
- b. Find HCF(144, 21). Both are Fibonacci numbers: 144 is the 12th and 21 is the 8th. What do you notice?
- c. Find the LCM of 21 and 34.

Task C: The golden ratio

The golden ratio ϕ is the positive root of $x^2 = x + 1$. Use $\sqrt{5} = 2.236$.

- a. Find ϕ exactly, and then to 3 decimal places using $\sqrt{5} = 2.236$.
- b. Show that $\phi^2 = \phi + 1$ by working out both sides exactly.
- c. Divide 34 by 21, and 55 by 34, each to 3 decimal places. Compare with ϕ .

Extension

1. You climb a staircase taking 1 or 2 steps at a time. There is 1 way to climb 1 step, 2 ways to climb 2 steps and 3 ways to climb 3 steps. How many ways are there to climb 10 steps?
2. How many ways are there to tile a 2 by 8 strip with 2 by 1 dominoes?