

Women in maths: mathematician cards for CBSE

Class 10

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

Name _____

Class _____

Date _____

No calculator. Use $\pi = 22/7$ where a question says so.

Starter (5 minutes)

1. Is $2 \times 29 + 1$ a prime number?
2. Write 95 as a product of primes.
3. Find the area of a sector of radius 7 cm and angle 90° . (Use $\pi = 22/7$.)
4. Find the HCF of 23 and 47.

Main activity (35 minutes)

Task A: Card 1: Sophie Germain primes

A prime p is a Sophie Germain prime when $2p + 1$ is also prime. For example, 11 is one, because 23 is prime.

- a. Find all the Sophie Germain primes less than 50. How many are there?
- b. Find the smallest prime p for which $2p + 1$ is not prime.
- c. Every prime bigger than 3 has the form $6q + 1$ or $6q + 5$ (Euclid's division lemma with divisor 6). Show that if $p = 6q + 1$ then $2p + 1$ is a multiple of 3.

Task B: Card 2: Nightingale's rose diagram

Florence Nightingale is known for polar area diagrams ('rose diagrams'): 12 months drawn as 12 equal sectors of 30° , where the area of each sector shows the number. Use $\pi = 22/7$.

- a. Find the area of a 30° sector of radius 14 cm.
- b. Another month needs 4 times the area. What radius should its sector have?
- c. Find the perimeter of the 30° sector of radius 14 cm.

Task C: Card 3: the witch of Agnesi

The curve $y = 8/(x^2 + 4)$ is one of a family known as the witch of Agnesi, after Maria Gaetana Agnesi.

- a. Copy and complete the table, giving y as a fraction: $x = 0, 1, 2, 3, 4$. Then plot the points for $x = -4$ to 4 .
- b. Find the values of x for which $y = 1/2$.
- c. Does the point $(2, 1)$ lie on the curve? Show how you know.

Extension

1. Find all the Sophie Germain primes between 50 and 100.
2. A rose diagram uses a sector of radius 7 cm for 35 cases. What radius is needed for 140 cases?