

Women in maths: mathematician cards for IGCSE and GCSE

IGCSE Math Revision · IGCSE and GCSE (Higher and Extended) · Student sheet

Name _____

Class _____

Date _____

The starter is non-calculator. A calculator is allowed in the main activity.

Starter (5 minutes)

1. Is $2 \times 11 + 1$ a prime number?
2. Write 95 as a product of prime factors.
3. Find the area of a sector of radius 6 cm and angle 60° , in terms of π .
4. Work out $8 \div (2^2 + 4)$.

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, 5 is one, because 11 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. Start at 2 and keep doubling and adding 1. Which is the first number in the chain that is not prime?

Task B: Card 2: 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. Complete a table of values for $x = 0, 1, 2, 3$ and 4 , giving y to 2 decimal places where needed. Use symmetry for negative x , and draw the graph.
- b. Write down the coordinates of the highest point and the equation of the line of symmetry.
- c. Solve $8/(x^2 + 4) = 1/2$, giving your answers to 3 significant figures.

Task C: Card 3: Nightingale's rose diagram

Florence Nightingale is known for polar area diagrams ('rose diagrams'): 12 months drawn as 12 equal sectors, where the area of each sector shows the number. The numbers here are made up.

- a. What is the angle of each sector?
- b. One sector has radius 5 cm. Find its area, to 3 significant figures.
- c. Each 1 cm^2 stands for 10 cases. About how many cases does the sector in part (b) show?
- d. Another month needs 4 times the area. What radius should its sector have?

Extension

1. Find all the Sophie Germain primes between 50 and 100.
2. In a rose diagram, one sector has radius 3 cm and another has radius 6 cm. How many times as many cases does the bigger one show?