

Maths art for IGCSE and GCSE: curve stitching, tessellations and graph pictures

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

Name _____

Class _____

Date _____

No calculator needed.

Starter (5 minutes)

1. Find each angle of an equilateral triangle.
2. Find the gradient of the line through $(0, 8)$ and $(2, 0)$.
3. Work out $360 \div 120$.

Main activity (35 minutes)

Task A: Curve stitching

On squared paper, mark 1 to 9 along both axes. Join $(1, 0)$ to $(0, 9)$, $(2, 0)$ to $(0, 8)$, and so on up to $(9, 0)$ to $(0, 1)$. The straight lines make a curve.

- a. Find the equation of the line joining $(2, 0)$ and $(0, 8)$.
- b. Find the equation of the line joining $(3, 0)$ and $(0, 7)$.
- c. Find where these two lines cross.

Task B: Tessellations

A tessellation covers the page with no gaps. At every corner, the angles must add to 360° .

- a. Find the interior angle of a regular hexagon. How many fit together round a point?
- b. Explain why regular pentagons do not tessellate.
- c. A tiling has two regular octagons and a square at every corner. Show that the angles fit.

Task C: Graph pictures

Draw a house and a smile with equations, on graph paper or in a graph plotter.

- a. The left side of a roof goes through $(0, 4)$ with gradient 1. Write its equation.
- b. The right side goes through $(0, 4)$ with gradient -1 . Where does it meet the x -axis?
- c. A smile is $y = x^2 - 4$ for $-2 \leq x \leq 2$. Find its lowest point and where it meets the x -axis.

Extension

1. Find the equation of the curve-stitching line from $(5, 0)$ to $(0, 5)$.