

Overview: *Isosceles Triangles*

Problem outline

In this problem you are asked to draw some isosceles triangles with an area of 9 cm^2 and a vertex at the point (20, 20). If all the vertices must have whole-number coordinates, how many triangles is it possible to draw? There is interactivity to support discussion and the organisation of solutions if required.

Why do this problem?

This problem calls on pupils to connect a wide range of mathematical knowledge including coordinates, properties of isosceles triangles, area of a triangle, factors and symmetry. The solution, which is numerically quite small, is attainable without being trivial and requires an organised and systematic approach. An emphasis should be placed on being able to justify, through the rigour of the approach, that all the solutions could be, or have been found. This is more important than finding some or even all of the solutions.

For the problem itself and some associated teachers' notes

[Isosceles Triangles](#)

Curriculum references: process

The guidance sections 'What teachers might do' offer suggested actions that can help to draw out pupils' skills in interpreting and evaluating. There is, however, a breadth of opportunities to develop a range of process skills including:

- Select mathematical information and tools to use, making connections within mathematics.
- Work logically towards results and solutions, recognising the impact of constraints and assumptions, and identifying and classifying patterns.
- Make and begin to justify conjectures and generalisations, forming convincing arguments.
- Engage with someone else's approaches, arguments and results.
- Consider the elegance and efficiency of alternative solutions.

Curriculum references: content

Geometry and measures: Transformations and coordinates; Measures and mensuration.

Apply knowledge of reflection and rotation to investigate isosceles triangles within a coordinate system using ICT.

Other useful links

A problem investigating symmetry: [Mirror, Mirror ...](#)

A problem involving coordinates: [Lost](#)