04 / STUDENT ACTIVITY

Which rectangle gives the most space?

Suggested MYP Years 1-3 | 35 minutes | Area and optimisation

Name: _____ Class: _____ Date: _____

Inquiry question

If every rectangle has the same perimeter, must it have the same area?

You have 24 units of fencing to enclose a rectangle. Use positive whole-number side lengths. All four sides need fencing; no gates or shared walls are included.

You need: Squared paper; ruler

1. Find every different rectangle you can make; rotating a rectangle does not make a new case.

2. Compare areas and choose a representation that reveals a pattern.

3. Identify the largest area and explain why your list is complete.

4. Describe what happens to the area as the side lengths become more alike.

Record your investigation

Use the space below and extra paper for diagrams, tables, calculations and your conclusion.

Exit response: What did you revise, and what evidence changed your mind?

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Teaching purpose

A small set of accessible trials opens into a general argument and a discussion of domain restrictions.

Expected findings / checked solution

Possible pairs are (1,11), (2,10), (3,9), (4,8), (5,7), (6,6). Areas are 11, 20, 27, 32, 35, 36 square units. With side lengths x and 12 - x, area is $x(12 - x) = 36 - (x - 6)^2$, so the square maximises area even if positive non-integer lengths are permitted.

Neutral teacher prompt

How will you know you have found every distinct rectangle?

Support

Provide 24 unit strips and allow trial constructions.

Extension

Generalise to perimeter P: show the maximum area is $P^2/16$ for positive real side lengths.

Suggested lesson rhythm

Launch for 5 minutes; explore for 20 minutes; compare approaches for 7 minutes; finish with a 3-minute exit response.

Formative evidence

Look for chosen methods, defined variables, independent checks and explanations. These are teaching activities, not IB-issued assessments or automatic criterion scores. Use current school assessment guidance for summative work.

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