05 / STUDENT ACTIVITY

When should you switch plans?

Suggested MYP Years 2-4 | 40 minutes | Linear models

Name: _____ Class: _____ Date: _____

Inquiry question

Which hire plan is cheaper, and when does the answer change?

A fictional bicycle hire service offers Plan A at 6 currency units plus 2 per hour, or Plan B at 15 plus 0.5 per hour. Time t is measured continuously for 0 <= t <= 8 hours. There are no extra charges or rounding rules.

You need: Calculator; graph paper

1. Choose useful hire times and compare both costs.

2. Represent the relationship with equations and a graph, defining your variables and units.

3. Find the break-even time and justify your recommendation for shorter and longer hires.

4. Consider a service that instead charges for each started hour. Explain how the model would change.

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

The recommendation must depend on the model and its domain, giving equations and graphs a practical purpose.

Expected findings / checked solution

A(t) = 6 + 2t and B(t) = 15 + 0.5t. Equality occurs at t = 6 hours, costing 18. A is cheaper for 0 <= t < 6; B for 6 < t <= 8. If both services charge each started hour, replace t with the ceiling of t (at t = 0 use zero); equality holds for 5 < t <= 6, and costs are step functions.

Neutral teacher prompt

What do the intercept and gradient mean in this situation?

Support

Start with a table at 0, 2, 4, 6 and 8 hours.

Extension

Design a third plan that is cheapest for some, but not all, times in the domain.

Suggested lesson rhythm

Launch for 5 minutes; explore for 25 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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