

4.1 Quantitative problem solving and data

Name: _____ Class: _____ Date: _____

KEY WORDS conditional probability • numerical entry

Objective

Solve algebraic, geometric and data-analysis problems; Select all valid options where requested; Enter numerical answers in the required form and use the on-screen calculator appropriately.

Original public tasks and locally authored marking guidance. No official score is assigned.

1 Key knowledge and worked examples

conditional probability : Probability within a specified condition.

numerical entry : An answer entered as a number rather than an option.

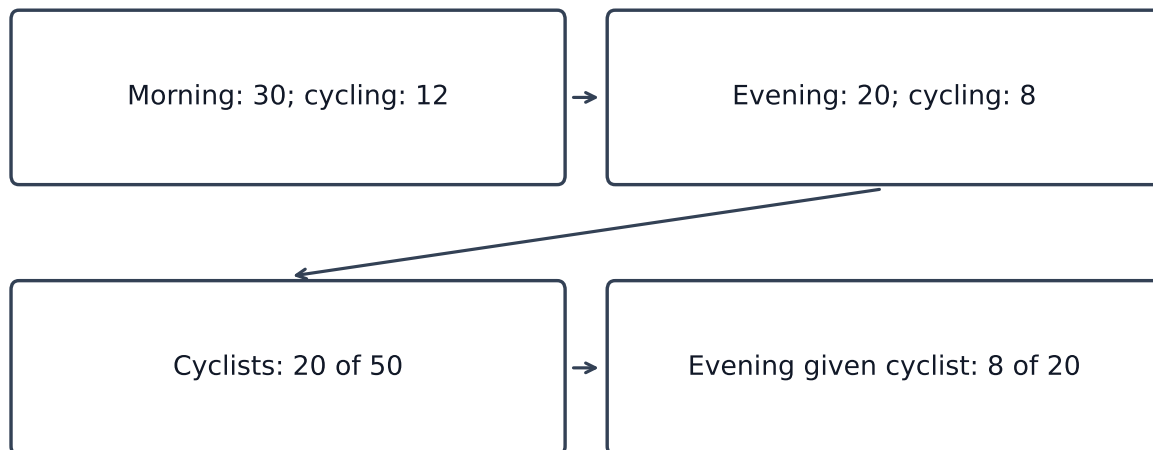
GRE General quantitative content includes arithmetic, algebra, geometry and data analysis; calculus is not required.

Read whether a problem asks for one answer, all answers or numerical entry. Check units and form before submitting.

For data interpretation, identify the denominator and whether a percentage is conditional on a subgroup.

The on-screen calculator is available for General quantitative sections. Estimate first to catch an entry error.

A class has 12 morning and 8 afternoon students. Of them, 3 morning and 4 afternoon students cycle. $P(\text{cycles})=7/20$. $P(\text{afternoon given cycles})=4/7$. The second denominator includes only cyclists.



Condition on cyclists: 8 of the 20 cyclists travelled in the evening

2 Practice

2.1 In an original survey table, morning students number 30 and evening students 20. Twelve morning and eight evening students cycle. Enter the probability that a randomly chosen student cycles as a decimal. Enter the probability that a cyclist is an evening student as a fraction.

3 Exam-style questions

3.1 A rectangular display has area 48 cm^2 , positive integer side lengths and perimeter at most 32 cm. Select all possible lengths of its longer side: 6, 8, 12, 16, 24. Show why your list is complete.

Solutions

2.1 Total students are 50 and cyclists 20. The unconditional probability is $20/50 = 0.4$. Restricting to cyclists gives evening probability $8/20 = 2/5$. The denominator changes from 50 to 20 because the second question supplies a condition. An evening student cycling has the reversed probability $8/20$ here only by numerical coincidence: the evening group and cyclist group both happen to have size 20.

3.1 8 and 12. Let the longer side be L and shorter side $48/L$. Positive integer factor pairs are $(1,48), (2,24), (3,16), (4,12), (6,8)$. Their perimeters are 98, 52, 38, 32, 28 cm. Only the last two meet the bound, with longer lengths 12 and 8. Six is the shorter side of the valid 6-by-8 rectangle, so it fails the requested role. Test both the geometric restriction and the word “longer”; numerical compatibility alone is insufficient.

Local review checklist: follow every response instruction; support the answer with the stated evidence; explain rejected alternatives or an opposing view; check scope, restrictions and clarity. For writing, this is a formative checklist, not an official rubric score.