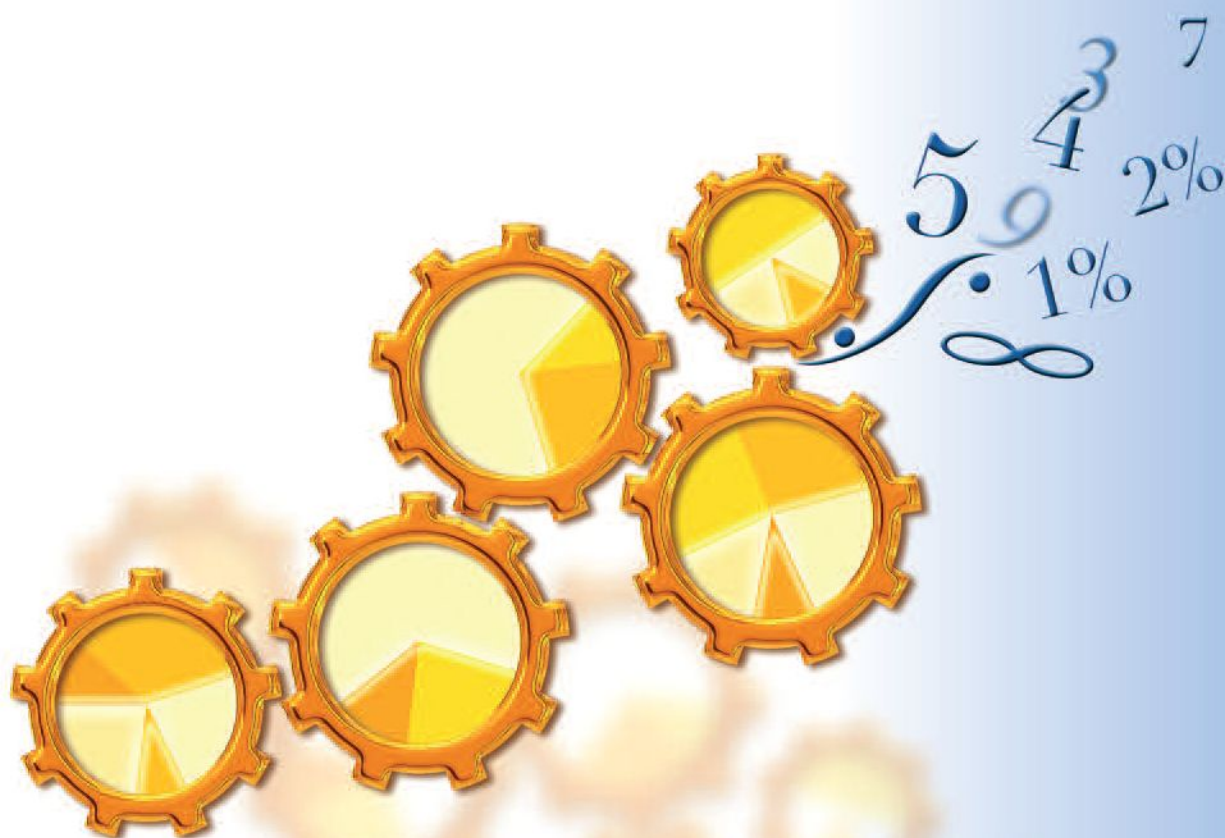


NUMERICAL REASONING MCQ

for European institution competitions



CONTENT

	Who is this book for?	7
Part 1	Organisation of the admission tests	9
Chapter 1	How the competitions are organised.....	11
Chapter 2	Scoring	13
Chapter 3	Computer-based testing.....	15
Part 2	Methodology	23
Chapter 4	Test principles	25
Chapter 5	Analysing a question	27
Chapter 6	Solving distribution problems	33
Chapter 7	Solving direct proportion problems.....	37
Chapter 8	Calculating simple averages.....	41
Chapter 9	Calculating weighted averages.....	43
Chapter 10	Calculating variations	47
Chapter 11	Applying variation rates (1).....	49
Chapter 12	Applying variation rates (2).....	53
Chapter 13	Reading tables containing variation rates.....	57
Chapter 14	Combining variation rates (1).....	61
Chapter 15	Combining variation rates (2).....	63
Chapter 16	Avoiding intermediary calculations.....	65
Chapter 17	Avoiding automatic use of the calculator	67
Part 3	Tests	71
	Test presentation.....	73
	Test 1	75
	Test 2	81
	Test 3	87
	Test 4	93
	Test 5	99
	Test 6	105
	Test 7	111
	Test 8	117
	Test 9	123
	Test 10.....	129
	Test 11	137
	Test 12.....	143
Part 4	Answers	149

■ Part 5

Detailed explanations of the answers to the tests..... 155

Detailed explanations of the answers to test 1 157

Detailed explanations of the answers to test 2 163

Detailed explanations of the answers to test 3 169

Detailed explanations of the answers to test 4 175

Detailed explanations of the answers to test 5 181

Detailed explanations of the answers to test 6 187

Detailed explanations of the answers to test 7 193

Detailed explanations of the answers to test 8 199

Detailed explanations of the answers to test 9 207

Detailed explanations of the answers to test 10 215

Detailed explanations of the answers to test 11 221

Detailed explanations of the answers to test 12 225

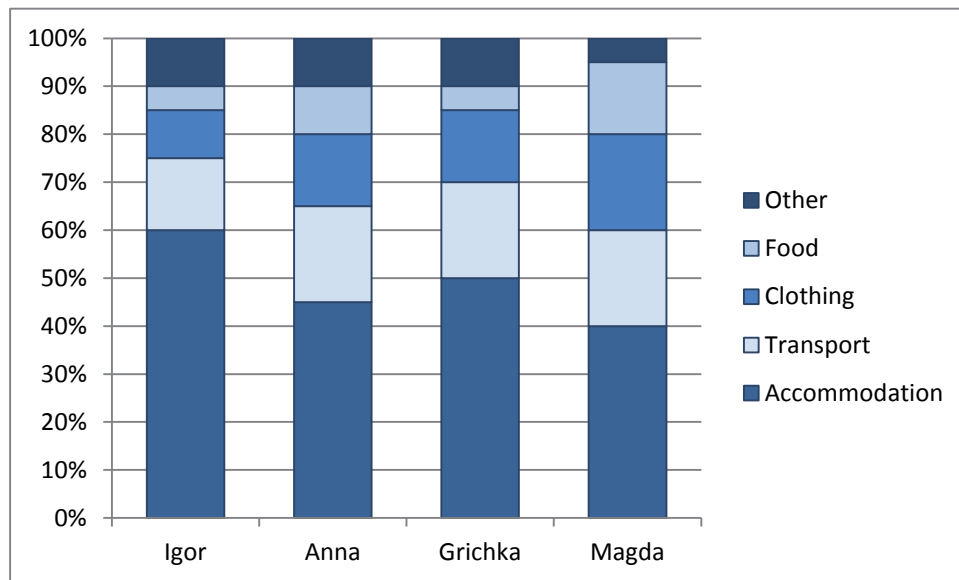
Who are we? 231

CHAPTER 6 - SOLVING DISTRIBUTION PROBLEMS

1. EXAMPLE QUESTION

Here is a first question involving a distribution problem. Take your time answering it. The answer appears on the following page.

Spending distribution



- Q2.** Grichka spent 480 euros on clothing, ie 20% less than Anna. How much did Anna spend on accommodation?
- a) 1 152 euros
 - b) 1 440 euros
 - c) 1 728 euros
 - d) 1 800 euros
 - e) Impossible to tell

2. ANSWER

The correct answer to question 2 is answer d).

3. METHOD

You must proceed in two stages:

- firstly, use the information contained in the text to calculate Anna's spending on clothing;
- then, use the data in the graph to calculate Anna's spending on accommodation.

4. RESOLUTION

► Resolution - stage 1

"Grichka spent 480 euros on clothing, ie 20% less than Anna." This means that if we deduct 20% from Anna's spending on clothing, we get Grichka's spending on clothing. So, the equation to solve is as follows:

$$\begin{aligned} \text{Anna's spending on clothing} - (20\% \times \text{Anna's spending on clothing}) \\ = \text{Grichka's spending on clothing} \end{aligned}$$

By simplifying this, we get:

$$0.8 \times \text{Anna's spending on clothing} = \text{Grichka's spending on clothing}$$

Therefore:

$$\begin{aligned} \text{Anna's spending on clothing} &= \text{Grichka's spending on clothing} / 0.8 \\ &= 480 / 0.8 = 600 \end{aligned}$$

► Resolution - stage 2

The graph gives the distribution of Anna's spending under 5 headings (the total of each column = 100%). We see that:

- clothing accounts for 15% of her spending;
- accommodation accounts for 45% of her spending.

Anna's spending on accommodation is therefore three times greater than her spending on clothing. Therefore the equation to be solved is:

$$\text{Anna's spending on accommodation} = 3 \times \text{Anna's spending on clothing}$$

Therefore:

$$\text{Anna's spending on accommodation} = 3 \times 600 = \mathbf{1\ 800\ euros}$$

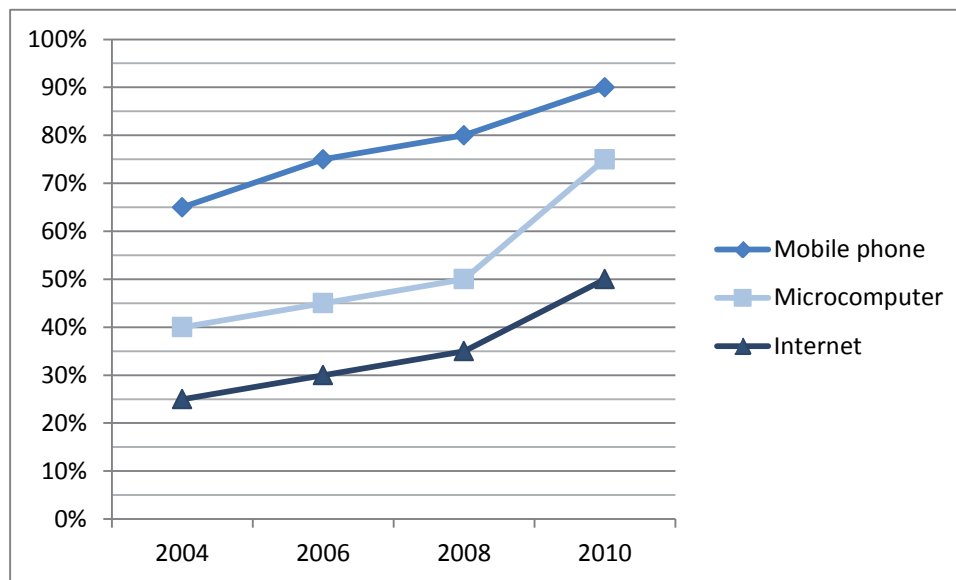
**Cereal production in Poldavia
(in thousands of tonnes)**

	2006	2007	2008	2009
Wheat	5 809	4 982	5 737	5 333
Barley	1 089	987	1 234	910
Oats	428	391	508	472
Maize	6 109	7 367	6 491	7 990

83. In 2010, Poldavia exported 4 981 500 tonnes of wheat, ie 2.5% more than in 2008. In 2008, what percentage of Poldavia's wheat production was sold on its internal market?

- a) 10%
- b) 15%
- c) 75%
- d) 85%
- e) 90%

Household equipment rates for mobile phones, microcomputers and internet



84. In 2008, there were 2 480 600 households. What was the minimum number of households that had both a mobile phone and a microcomputer in 2008?

- a) None
- b) 496 120
- c) 744 180
- d) 1 118 520
- e) 1 860 450

5 ▶ C

Understanding the question and method

We need to proceed in three stages:

- first, we calculate the catches of tuna and cod in 2005;
- next, we calculate the catches of tuna and cod in 2010 using the data in the graph;
- then, we calculate the relative variation between these two years.

Solution

Stage 1:

Cod catch in 2005: $1\,400 - 600 = 800$

Tuna catch in 2005: $1\,400 + 200 = 1\,600$

Cod and tuna catches in 2005: $800 + 1\,600 = 2\,400$

Stage 2:

Cod and tuna catches in 2010: $1\,000 + 2\,000 = 3\,000$

Stage 3:

Relative variation: $(3\,000 - 2\,400) / 2\,400 = 0.25 = + \mathbf{25\%}$

6 ▶ B

Understanding the question and method

The aim is to find the average annual fruit production for the period 2009-2010. This is a simple average: we divide the total production by the number of years, ie by 2.

Fruit production in 2009 and in 2010 is calculated in the same way. For example:

Pear production in 2009 = $16\% \times$ fruit production

Therefore:

Fruit production in 2009 = pear production / 0.16

Solution

Fruit production in 2009 = $216 / 0.16 = 1\,350$

Fruit production in 2010 = $312 / 0.12 = 2\,600$

Annual average = $(1\,350 + 2\,600) / 2 = \mathbf{1\,975\ tonnes}$

7 ▶ B

Understanding the question

In the category "part-time / aged under 50", we have to find the percentage who work fewer than 15 hours per week.