



Effective Crash Course • Practice Questions • Homework • Past Paper Questions



Contents

	Pra	ctice	Homework	Answers
Chapter 1:	p. 1		p. 21	p. 33
• Permutations				
Chapter 2:	p. 36		p. 51	p. 58
Combinations				
Chapter 3:	p. 61		p. 78	p. 95
Networks				
Critical Path Analysis				
Chapter 4:	p. 99		p. 106	p. 118
Logical Questions				
Chapter 5:	p. 122		p. 138	p. 154
Logical Questions				





Practice Questions

- 5 Three girls Jane, Alice and Rachel, decide to hold a competition of swimming. They will do sidestroke and then butterfly stroke. If Jane wins the sidestroke and Alice wins the butterfly stroke, the outcome would be represented as JA.
 - (a) What does RJ represent?
 - (b) Make a list of all the 9 possible outcomes.
 - (c) If only Jane and Alice take part in the competition there will be fewer possible outcomes. List the outcomes in this case.
 - (d) If Hannah also takes part in the competition, list all the possible outcomes for the four competitors.

An office gate needs a correct combination of four digits in correct order.

When 5768 is tried, two digits are wrong When 4769 is tried, two digits are wrong When 4239 is tried, two digits are wrong When 5169 is tried, two digits are wrong When 4168 is tried, all the digits are wrong.





© piacademy.co.uk – All rights reserved Visit piacademy.co.uk to check more resources





Practice Questions

9 In the men's football game at the 2016 Olympics, Team U.K. defeated Team Korea 3-0. Each team had 11 players. Assume each of the 11 players on Team U.K. shook hands with each of the 11 players on Team Korea. What was the number of handshakes?



10 In a college athletics competition with 10 participants, in how many ways can they finish in the positions "winner", "runner-up" and "third place"?









Practice - Past Paper Questions

In a doctor's waiting room, there are 6 seats in a row.

Mr Spencer arrives with his 2 children. He wants to sit between his 2 children.

3 other people arrive who do not mind where they sit.



How many different possible seating arrangements are there of the 6 people? *You may find the boxes helpful.*





Ref: London Independent Girls' Schools', Q35, 11+ Past Paper 2014





Some pages are omitted from this book preview

Complete handbook is free for the students who booked PiAcademy's Permutation, Combination & Network Analysis crash course

11+ Online School – Permutation, Combination & Network Analysis Crash Course

Availability: Only 7 SEATS LEFT now!

Course Timeline

- 5 Days of crash course
- Each Session = 1 hour 30 minutes

£299.00

Book your slot at

https://piacademy.co.uk/online-classes/



11+

Permutation, Combination & Network Analysis Topics Mastery





On the island of Pythageuleria all vehicle number plates have 2 letters from the selection A, B, C, D, followed by a number 1, 2, 3 or 4.

For example:



Note that repeated letters are allowed.

(a) Calculate how many plates start with a double B.

A			£11
Answer:			111

(b) Calculate how many plates there are that start with any repeated letter.

Answer: _____ [2]

(c) Calculate how many plates contain just one vowel and an odd number.

Answer: _____ [3]

(d) Given that there are 64 possible codes in total, calculate what fraction of the number plates have their two letters in alphabetical order, giving your answer in its lowest form.

Answer: _____ [3]

Ref: Dulwich College, Q18, 11+ Past Paper a

















a) List all the possible combinations of two boxes from the five boxes, ignoring order.

b) State the total number of combinations.

2 In a basketball tournament, there are 10 teams. If each team plays one [2] match with every other team, then what is the total number of matches?









In this subtraction, P, Q, R, S and T represent single digits.

	7	Q	2	S	Т
-	Р	3	R	9	6
	2	2	2	2	2

What is the value of P + Q + S + T?

Ref: Kent College, Canterbury, Q23, 11+ Past Paper 2020

6

On a game show, there are 3 doors. Behind one door, there is £1000 and behind another, there is a spider! Behind the other door there is nothing.

[2]

.....(3)

Each door has a notice. However, only one notice is true.



Behind which door is £1000?

Answer:

Ref: London Independent Girls' Schools' Consortium, Q41, 11+ Past Paper 2014









a) How many different routes are there from A to F?

b) What is the distance of the longest route?



Find the critical path of the following network diagram.







Some pages are omitted from this book preview

Complete handbook is free for the students who booked PiAcademy's Permutation, Combination & Network Analysis crash course

11+ Online School – Permutation, Combination & Network Analysis Crash Course

Availability: Only 7 SEATS LEFT now!

Course Timeline

- 5 Days of crash course
- Each Session = 1 hour 30 minutes

£299.00

Book your slot at

https://piacademy.co.uk/online-classes/



11+

Permutation, Combination & Network Analysis Topics Mastery





Keypoints

- 1. Activity Network: This is essentially a way of illustrating the given project data concerning the tasks to be completed, how long each task takes and the constraints on the order in which the tasks are to be completed.
- 2. **Algorithm for constructing activity networks:** For simple problems it is often relatively easy to construct activity networks but, as the complete project becomes more complex, the need for a formal method of constructing activity networks increases. Such an algorithm is summarised below.

Start: Write down the original copy of them alongside. If activity Y must follow activity X draw an arc from original vertex Y to shadow vertex X. Step 1: Make a list of all the original vertices which have no arcs incident to them.

Step 2: Delete all vertices found in step 1 and their corresponding shadow vertices and all arcs incident to these vertices.

Step 3: Repeat steps 1 and 2 until all the vertices have been used.

3. Critical path: To find the critical path, it will involve:

First finding the earliest possible start for each activity, by going forwards through the network.

Secondly, the latest possible start time for each activity is found by going backwards through the network.

Activities which have equal earliest and latest start time are on the **critical path**.







Keywords

a) Networks

b) Arc

c) Activity

d) Shortest route

e) Network diagram

f) Routes

g) Minimum completion time

h) Critical path

i) Critical activities







The card is black on the front and green on the back. When piece A is [2] turned over, which of the shapes below shows its green side?



© piacademy.co.uk – All rights reserved Visit piacademy.co.uk to check more resources





Chapter 5: Answers

Practice - Past Paper questions:

- D. U 1.
- 2. a) 4 b) 20 c) 48 d) 24
- 3. 19:50
- 4. 162
- 5. 13 41

Homework

- a) 3 1.
 - b) 3
 - c) 1
 - d) 4
 - e) 4

2.



3.

a)	16	2	12
	6	10	14
	8	18	4

4. a) 4 8 6 10 12 14 16 b) 14



© piacademy.co.uk - All rights reserved Visit piacademy.co.uk to check more resources



Snap up other helpful resources for your students exam preparation:



11+ Maths: https://piacademy.co.uk/11-plus-maths-papers/

- **11+ English:** https://piacademy.co.uk/11-plus-english-papers/
- **11+ NVR:** https://piacademy.co.uk/11-plus-nvr-papers/
- **11+ VR:** https://piacademy.co.uk/11-plus-vr-papers/
- 13+ Maths: https://piacademy.co.uk/13-plus-maths-papers/
- 13+ English: https://piacademy.co.uk/13-plus-english-papers/



Some pages are omitted from this book preview

Complete handbook is free for the students who booked PiAcademy's Permutation, Combination & Network Analysis crash course

11+ Online School – Permutation, Combination & Network Analysis Crash Course

Availability: Only 7 SEATS LEFT now!

Course Timeline

- 5 Days of crash course
- Each Session = 1 hour 30 minutes

£299.00

Book your slot at

https://piacademy.co.uk/online-classes/



11+

Permutation, Combination & Network Analysis Topics Mastery