2.3 Systematic Listing: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A shop sells shirts in red or blue and trousers in black or grey. List all possible outfits that consist of one shirt and one pair of trousers.

(Total for Question 1 is 2 marks)

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2 A sandwich shop makes rolls using one type of bread (white or brown) and one filling (cheese, ham or tuna).

(a) List all the different rolls that could be made. **(2)**

(b) Write down the total number of different rolls possible. **(1)**

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(Total for Question 2 is 3 marks)

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3 A locker code uses 2 different digits chosen from 1, 2, 3 and 4. No digit is repeated in a code.

(a) List all the possible codes. **(2)**

(b) Write down the total number of different codes possible. **(1)**

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(Total for Question 3 is 3 marks)

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4 A charity bake sale sells cupcakes in 2 flavours (vanilla, chocolate) and 2 icing colours (pink, white).

(a) List all the different flavour-and-icing combinations that could be made. **(2)**

(b) Write down the total number of different cupcakes possible. **(1)**

(Total for Question 4 is 3 marks)

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5 Two fair spinners are spun together. Spinner P has three equal sections numbered 1, 2 and 3. Spinner Q has three equal sections numbered 2, 4 and 6. The two numbers shown are multiplied together to give a score.

Spinner P

Spinner Q	x	1	2	3
	2	2		
	4			
	6			18

(a) Complete the sample space diagram to show all 9 possible scores. **(2)**

(b) Use your diagram to find the probability that the score is greater than 10. **(2)**

(Total for Question 5 is 4 marks)

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6 A padlock uses a 2-letter code chosen from the letters V, W, X, Y and Z. No letter is repeated in a code.

(a) List all the possible codes. **(2)**

(b) Write down the total number of different codes possible. **(1)**

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(Total for Question 6 is 3 marks)

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7 A cafe sells jacket potatoes with a choice of 3 fillings (cheese, beans, tuna) and 2 sizes (regular, large). A table showing some of the possible combinations has been started below, but is not yet complete.

	Cheese	Beans	Tuna
Regular	✓	✓	
Large	✓		✓

(a) Complete the table to show all 6 possible size-and-filling combinations. **(2)**

(b) Write down the total number of different jacket potatoes possible. **(1)**

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(Total for Question 7 is 3 marks)

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8 List all the 2-letter arrangements from the letters A, B and C if no letter is used more than once.

(Total for Question 8 is 2 marks)

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9 Four charity bake-sale items, a flapjack, a brownie, a cookie and a muffin, are to be arranged in a row on a shelf. Work out how many different arrangements are possible.

(Total for Question 9 is 2 marks)

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10 A school ID badge shows one shape chosen from circle, square, triangle and star, together with one colour chosen from red, green and blue. Work out how many different badges can be made in which the shape is not a star.

(Total for Question 10 is 2 marks)

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11 A dessert cart sells ice cream in 4 flavours and 3 toppings. A customer chooses one flavour and one topping.
Without listing them, work out the total number of different one-scoop, one-topping ice creams possible.

(Total for Question 11 is 2 marks)

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12 A restaurant's set menu offers a choice of 3 starters, 4 main courses and 2 desserts. A customer chooses one of each course.
Work out the total number of different three-course meals possible.

(Total for Question 12 is 2 marks)

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13 A fencing company offers fence panels in 3 styles (lattice, picket, plain) and paint in 2 colours (green, brown). A customer chooses one style and one colour.

(a) List, or draw a table to show, all the different style-and-colour combinations possible. **(2)**

(b) A combination is chosen at random from all the possibilities in part (a). Find the probability that it is the picket style painted brown. **(2)**

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(Total for Question 13 is 4 marks)

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14 A padlock code is made from 3 digits. Each digit is chosen from 0 to 9 and digits may be repeated.
Work out the total number of different codes possible.

(Total for Question 14 is 2 marks)

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15 A cafe offers 5 different toppings. A customer chooses 2 different ones. The order does not matter. How many different choices are there?

(Total for Question 15 is 3 marks)

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16 Nadia wants to make exactly 30p using only 20p, 10p and 5p coins. She may use more than one of each coin, or none of some of them.
List all the different ways she could make exactly 30p, showing the number of each coin used each time.

(Total for Question 16 is 3 marks)

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17 A meal deal lets a customer choose 1 of 3 breads, 1 of 4 fillings and 1 of 2 sauces. The chilli sauce cannot be chosen together with the tuna filling.
Work out the total number of different meal deals possible.

(Total for Question 17 is 3 marks)

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Mark scheme · 2.3 Systematic Listing: 1-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

systematic list of outfits shown, e.g. pairings shown clearly **M1**

four distinct outfits listed: red/black, red/grey, blue/black, blue/grey cao **A1**

Answer: red/black; red/grey; blue/black; blue/grey

Question 2

(a) systematic list or table shown, at least 4 correct rolls **B1**

(a) all 6 rolls correct with no repeats or omissions **B1**

(a) Answer: white+cheese, white+ham, white+tuna, brown+cheese, brown+ham, brown+tuna (6 rolls)

(b) 6 ft from part (a) or 6 cao **B1**

(b) Answer: 6

Question 3

(a) systematic list shown, at least 8 correct codes **B1**

(a) all 12 codes correct with no repeats or omissions **B1**

(a) Answer: 12, 13, 14, 21, 23, 24, 31, 32, 34, 41, 42, 43 (12 codes)

(b) 12 ft from part (a) or 12 cao **B1**

(b) Answer: 12

Question 4

(a) systematic list or table shown, at least 3 correct combinations **B1**

(a) all 4 combinations correct with no repeats or omissions **B1**

(a) Answer: vanilla+pink, vanilla+white, chocolate+pink, chocolate+white (4 combinations)

(b) 4 ft from part (a) or 4 cao **B1**

(b) Answer: 4

Question 5

(a) at least 5 correct scores entered in the grid **M1**

(a) all 9 scores correct: rows (Spinner Q down the side) 2,4,6 then 4,8,12 then 6,12,18 **A1**

(a) Answer: Grid rows top to bottom (Q = 2, 4, 6): 2,4,6 / 4,8,12 / 6,12,18

(b) identifies the 3 scores greater than 10 out of 9 **M1**

(b) 3/9 oe = 1/3 cao **A1**

(b) Answer: 1/3

Question 6

(a) systematic list shown, at least 12 correct codes **B1**

(a) all 20 codes correct with no repeats or omissions **B1**

(a) Answer: VW, VX, VY, VZ, WV, WX, WY, WZ, XV, XW, XY, XZ, YV, YW, YX, YZ, ZV, ZW, ZX, ZY (20 codes)

(b) 20 ft from part (a) or 20 cao **B1**

(b) Answer: 20

Question 7

(a) at least 4 cells correctly completed **M1**

(a) all 6 cells correctly completed with no repeats or omissions **A1**

(a) Answer: regular+cheese, regular+beans, regular+tuna, large+cheese, large+beans, large+tuna (6 combinations)

(b) 6 ft from part (a) or 6 cao **B1**

(b) Answer: 6

Question 8

systematic listing of ordered pairs or arrangements (eg start with A then B,C; then B then A,C; then C then A,B) oe **M1**

all six: AB, AC, BA, BC, CA, CB cao **A1**

Answer: AB, AC, BA, BC, CA, CB

Question 9

recognise 4 choices for the first position, 3 for the second, 2 for the third and 1 for the last, 4*3*2*1 oe **M1**

24 cao **A1**

Answer: 24

Question 10

identify 3 allowed shapes (excluding star) and multiply by 3 colours, 3*3 oe **M1**

9 cao **A1**

Answer: 9

Question 11

4 x 3 seen **M1**

12 cao **A1**

Answer: 12

Question 12

3 x 4 x 2, or 3 x 4 (=12) seen **M1**

24 cao **A1**

Answer: 24

Question 13

(a) systematic list or table shown, at least 4 correct combinations **B1**

(a) all 6 combinations correct with no repeats or omissions **B1**

(a) Answer: lattice+green, lattice+brown, picket+green, picket+brown, plain+green, plain+brown (6 combinations)

(b) identifies 1 favourable outcome out of 6 total **M1**

(b) 1/6 oe cao **A1**

(b) Answer: 1/6

Question 14

10 x 10 x 10 seen **M1**

1000 cao **A1**

Answer: 1000

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Question 15

systematic listing, or starts to count pairs without repeats	**M1**
method that avoids double counting	**M1**
10 cao	**A1**

Answer: 10

Question 16

systematic strategy shown, e.g. starting with the greatest number of 20p coins and reducing	**M1**
at least 4 correct combinations found	**A1**
all 6 combinations correct with no repeats: 1x20p+1x10p; 1x20p+2x5p; 3x10p; 2x10p+2x5p; 1x10p+4x5p; 6x5p	**A1**

Answer: 6 ways: 1x20p+1x10p; 1x20p+2x5p; 3x10p; 2x10p+2x5p; 1x10p+4x5p; 6x5p

Question 17

finds the total number of combinations with no restriction: 3 x 4 x 2 (= 24)	**M1**
correctly identifies the number of combinations that must be removed: 3 (one for each bread, with tuna and chilli sauce)	**M1**
21 cao	**A1**

Answer: 21

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