HIGHER

6.3 The Product Rule for Counting: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A code has 5 digits chosen from the digits 1 to 8. Digits can be repeated. How many different codes are possible?

(Total for Question 1 is 2 marks)

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2 A café has 5 hats, 3 scarves and 3 pairs of gloves. A customer chooses one of each. How many different choices are there?

(Total for Question 2 is 2 marks)

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3 7 different books are put on a shelf. The two largest books must be at the two ends. In how many different ways can the books be arranged?

(Total for Question 3 is 3 marks)

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4 Mia has 5 tops, 5 skirts and 4 jackets. Outfits are made from one top, one skirt and one jacket. She will not wear her red top with 3 of the skirts. How many outfits can she make?

(Total for Question 4 is 3 marks)

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5 A café has 5 shirts, 7 pairs of trousers and 3 pairs of shoes. A customer chooses one of each. How many different choices are there?

(Total for Question 5 is 2 marks)

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6 A locker code has 3 letters chosen from A, B, C, D, E, F, G, H and I, followed by 1 digit from 0 to 9. Letters and digits can be repeated. How many different codes are there?

(Total for Question 6 is 3 marks)

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7 A code has 5 digits chosen from the digits 1 to 6. Digits can be repeated. How many different codes are possible?

(Total for Question 7 is 2 marks)

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8 A café has 4 starters, 3 mains and 6 desserts. A customer chooses one of each. How many different choices are there?

(Total for Question 8 is 2 marks)

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9 6 people stand in a queue. The youngest person must be first. In how many different orders can they stand?

(Total for Question 9 is 3 marks)

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10 Mia has 4 tops, 3 skirts and 3 jackets. Outfits are made from one top, one skirt and one jacket. She will not wear her red top with 1 of the skirts. How many outfits can she make?

(Total for Question 10 is 3 marks)

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11 A shop sells 6 types of sandwiches and 7 types of drinks. Ravi buys one of each. How many different combinations can he choose?

(Total for Question 11 is 2 marks)

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12 A locker code has 2 letters chosen from A, B, C, D, E, F and G, followed by 1 digit from 0 to 9. The letters must all be different. How many different codes are there?

(Total for Question 12 is 3 marks)

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13 Using each of the digits 1, 3, 4 and 9 at most once, how many different 3-digit numbers can be made that are less than 500? A number cannot start with 0.

(Total for Question 13 is 4 marks)

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14 Mia has 5 tops, 4 skirts and 2 jackets. Outfits are made from one top, one skirt and one jacket. She will not wear her red top with 3 of the skirts. How many outfits can she make?

(Total for Question 14 is 3 marks)

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15 6 different books are put on a shelf. The two largest books must be at the two ends. In how many different ways can the books be arranged?

(Total for Question 15 is 3 marks)

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16 A code has 4 digits chosen from the digits 1 to 6. Digits can be repeated. How many different codes are possible?

(Total for Question 16 is 2 marks)

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17 There are 3 different roads from Ashby to Barton, and 4 different roads from Barton to Corby. A journey from Ashby to Corby goes through Barton.

(a) Work out the number of different routes from Ashby to Corby. **(2)**

.....

(b) On the return journey from Corby to Ashby (through Barton), the driver is not allowed to use either road that was used on the way there. Work out the number of different ways to make the return journey. **(2)**

.....

(Total for Question 17 is 4 marks)

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Mark scheme · 6.3 The Product Rule for Counting: 1-hour Pack

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

Question 1

8 x 8 x 8 x 8 x 8	**M1**
32768 cao	**A1**

Answer: 32768

Question 2

5 x 3 x 3 oe	**M1**
45 cao	**A1**

Answer: 45

Question 3

2 ways to place the two largest books	**M1**
5! ways for the rest	**M1**
240 cao	**A1**

Answer: 240

Question 4

5 x 5 x 4 = 100	**M1**
3 x 4 outfits not allowed	**M1**
88 cao	**A1**

Answer: 88

Question 5

5 x 7 x 3 oe	**M1**
105 cao	**A1**

Answer: 105

Question 6

number of letter combinations 729 found	**M1**
10 digit combinations	**M1**
7290 cao	**A1**

Answer: 7290

Question 7

6 x 6 x 6 x 6 x 6	**M1**
7776 cao	**A1**

Answer: 7776

Question 8

4 x 3 x 6 oe	**M1**
72 cao	**A1**

Answer: 72

Question 9

5 people to arrange in the remaining places	**M1**
5 x 4 x 3 x 2 x 1	**M1**
120 cao	**A1**

Answer: 120

Question 10

4 x 3 x 3 = 36	**M1**
1 x 3 outfits not allowed	**M1**
33 cao	**A1**

Answer: 33

Question 11

6 x 7	**M1**
42 cao	**A1**

Answer: 42

Question 12

number of letter combinations 42 found	**M1**
10 digit combinations	**M1**
420 cao	**A1**

Answer: 420

Question 13

considers the restricted digit first (or equivalent systematic method)	**M1**
product of the choices for each place	**M1**
correct treatment of the restriction	**M1**
18 cao	**A1**

Answer: 18

Question 14

5 x 4 x 2 = 40	**M1**
3 x 2 outfits not allowed	**M1**
34 cao	**A1**

Answer: 34

Question 15

2 ways to place the two largest books	**M1**
4! ways for the rest	**M1**
48 cao	**A1**

Answer: 48

Question 16

6 x 6 x 6 x 6	**M1**
1296 cao	**A1**

Answer: 1296

Question 17

(a) 3 x 4 oe seen	**M1**
(a) 12 cao	**A1**

(a) Answer: 12

(b) 3 x 2 oe seen (3 remaining roads Corby to Barton, 2 remaining roads Barton to Ashby)	**M1**
(b) 6 cao	**A1**

(b) Answer: 6

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