

Name: _____

GCSE (1 – 9)

The Product Rule for Counting

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

- 1 There are 12 boys and 15 girls in a class.
One boy and one girl will be selected to represent the class on the student council.
Work out the total number of ways of choosing a boy and a girl.

$$12 \times 15$$

180

(Total for question 1 is 2 marks)

- 2 There are 17 boys and 14 girls in a choir.
One boy and one girl will be selected to sing a duet.
Work out the total number of ways of choosing a boy and a girl.

$$17 \times 14$$

238

(Total for question 2 is 2 marks)

- 3 There are 14 boys and x girls in a choir.
One boy and one girl will be selected to sing a duet.
Taylor says there are 152 different ways of choosing a boy and a girl.

Could Taylor be correct?
You must show your working.

$$14x = 152$$

$$x = 10.857 \dots$$

Taylor cannot be correct. 152 is not divisible by 14.

(You cannot have 0.857 of a girl)

(Total for question 3 is 2 marks)

- 4 There are 5 starters and 6 main courses in a restaurant.

Work out the total number of ways of choosing a starter and a main course.

$$5 \times 6$$

30

(Total for question 4 is 2 marks)

- 5 There are 4 starters, 7 main courses and 4 desserts in a restaurant.

Work out the total number of ways of choosing a starter, a main course and a dessert.

$$4 \times 7 \times 4$$

112

(Total for question 5 is 2 marks)

- 6 There are 5 starters, 6 main course and x desserts in a restaurant.

Riley says there are 130 different ways of a starter, a main course and a dessert.

Could Riley be correct?

You must show your working.

$$30x = 130$$

$$x = 4.\bar{3}$$

Riley cannot be correct. x would have to be a whole number.

(Total for question 6 is 2 marks)

- 7 A meal deal includes a sandwich and a drink.
There are 5 sandwiches and 7 drinks to choose from.

Work out the total number of ways of choosing a sandwich and a drink.

$$5 \times 7$$

35

(Total for question 7 is 2 marks)

- 8 Mr Idris has 5 pairs of trousers, 9 shirts and 3 ties.

Work out the total number of ways of choosing a pair of trousers, a shirt and a tie.

$$5 \times 9 \times 3$$

135

(Total for question 8 is 2 marks)

- 9 There are 8 sandwiches and x drinks to choose from for lunch.

Pat says there are 96 different ways to choose a sandwich and a drink.

Could Pat be correct?

You must show your working.

$$8x = 96$$

$$x = 12$$

Pat could be correct. x could be 12.

(Total for question 9 is 2 marks)

- 10 There are 52 cards in a deck.
Peter is going to give one card to Casper and one card to Kelly.

How many different ways are there of going this?

$$52 \times 51$$

$$\underline{2652}$$

(Total for question 10 is 2 marks)

- 11 There are 52 cards in a deck.
Angel is going to give one card to Ben and one card to Chris and one card to Dylan.

How many different ways are there of going this?

$$52 \times 51 \times 50$$

$$\underline{132600}$$

(Total for question 11 is 2 marks)

- 12 There are 52 cards in a deck.
Tom is going to give two cards to Jay.

How many different pairs of cards could Jay get?

$$\begin{array}{r} 52 \times 51 \\ \hline 2 \end{array}$$

1326

(Total for question 12 is 2 marks)

- 13 There are 30 students in a class.
Two students are going to be selected to receive a prize.

How many different pairs of ~~two~~ students could be selected?

$$\begin{array}{r} 30 \times 29 \\ \hline 2 \end{array}$$

435

(Total for question 13 is 2 marks)

- 14 There are 10 teams in a football league.
Two teams are going to be chosen at random to play a match.

Work out the number of different matches that could take place.

$$\frac{10 \times 9}{2}$$

45

(Total for question 14 is 2 marks)

- 15 There are 8 teams in a competition.
Each team will play every other team once.

Work out the total number of games played.

$$\frac{8 \times 7}{2}$$

28

(Total for question 15 is 2 marks)

- 16 There are 10 people in a room.
Each person shakes each other person's hand once.

Work out the number handshakes that take place.

$$\frac{10 \times 9}{2}$$

45

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(Total for question 16 is 2 marks)

- 17 There are 20 people in a room.
Each person shakes each other person's hand once.

Work out the number handshakes that take place.

$$\frac{20 \times 19}{2}$$

190

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(Total for question 17 is 2 marks)