

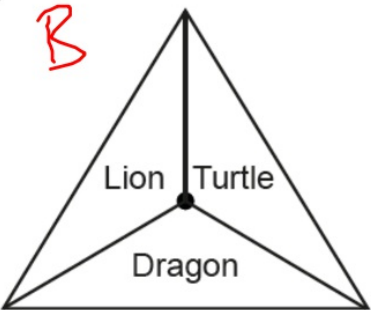
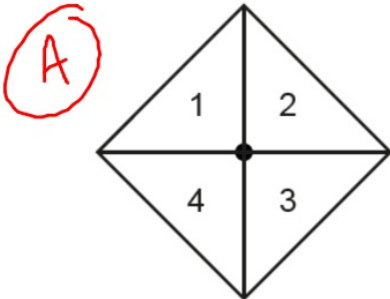
# N49 Listing Combinations

OCR



9 (a) Omar has a game.  
In his game there are two fair spinners.

Spinner A has four sides, labelled 1, 2, 3, 4.



Spinner B has three sides, labelled Dragon, Lion and Turtle.

Omar spins the two spinners and records the result.

(i) Complete the table showing all the possible outcomes.

Spinner A	Spinner B
1	D(ragon)
1	L
1	T
2	D
2	L
2	T
3	D
3	L
3	T
4	D
4	L
4	T

You may not need to use all the lines.

Video created by W Neill

- 15 Students at a school must choose one subject from Option 1 and one from Option 2. The school offers two languages, French and Spanish.

The subjects are given in this table.

Option 1	Option 2
French	Spanish
Art	Geography
Music	History
Economics	

Work out the percentage of all the subject combinations which have exactly one language.

..... % [4]

Video created by W Neill

- 15 Students at a school must choose one subject from Option 1 and one from Option 2. The school offers two languages, French and Spanish.

The subjects are given in this table.

Option 1	Option 2
French ✓	Spanish
Art	Geography
Music	History
Economics	

Work out the percentage of all the subject combinations which have exactly one language.

$$\frac{5}{12} = 0.41\bar{6} \times 100 = 41.6\bar{6}\% \checkmark$$

FS

FG

FH

AS

AG

AH

MS

MG

MH

ES

EG

EH

.....% [4]

- 7 (a) Frances has three cards: Ace (A), King (K) and Queen (Q).  
She shuffles these cards and deals them one at a time.

N49

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- (i) List all the different orders in which she can deal the cards.  
One possible order is already shown in the table.  
You may not need to use all the rows.

First card	Second card	Third card
A	K	Q

- (ii) Find the probability that, in the three cards Frances deals, the King (K) is dealt **immediately** after the Queen (Q).

P21

[2]

- 7 (a) Frances has three cards: Ace (A), King (K) and Queen (Q).  
 She shuffles these cards and deals them one at a time.

Created by W Neill

- (i) List all the different orders in which she can deal the cards.  
 One possible order is already shown in the table.  
 You may not need to use all the rows.

First card	Second card	Third card
A	K	Q
A	Q	K
K	A	Q
K	Q	A
Q	A	K
Q	K	A

Q → K

- (ii) Find the probability that, in the three cards Frances deals, the King (K) is dealt immediately after the Queen (Q).

P21

$$\frac{2}{6} = \frac{1}{3} \checkmark$$

[2]



9 Danisha is going to visit two of these places.

London Eye (LE) Buckingham Palace (BP) Tower of London (TL) British Museum (BM)

(a) List all the combinations of these places that she can visit.  
One combination is already shown in the table.

N49 You may not need all the rows. [2]

LE	BP

(b) What fraction of the combinations include the London Eye (LE)?

N32

(b) ..... [1]

9 Danisha is going to visit two of these places.

London Eye (LE) ✓ Buckingham Palace (BP) ✓ Tower of London (TL) British Museum (BM)

- (a) List all the combinations of these places that she can visit.  
One combination is already shown in the table.

N49 You may not need all the rows. [2]

LE	BP ✓
LE	TL ✓
LE	BM ✓
BP	TL
BP	BM
TL	BM

- (b) What fraction of the combinations include the London Eye (LE)?

N32

6 comb

$$\frac{3}{6}$$

(b) ..... [1]

14 John has

- 8 different shirts
- 6 different hats
- 4 different scarves.

(a) On Monday, he picks a shirt, a hat and a scarf.

Show that there are 192 different combinations he can pick.

..... [1]

(b) John thinks that if he picks **just two** of the three items of clothing there will be more than 192 combinations.

Is he correct?  
Show your reasoning.

.....  
..... [3]

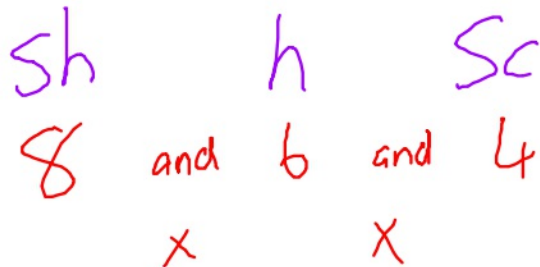
14 John has

N49

- 8 different shirts
- 6 different hats
- 4 different scarves.

$8 \times 6 = 48$

$$\begin{array}{r}
 48 \times 4 \\
 \hline
 192
 \end{array}$$



(a) On Monday, he picks a shirt, a hat and a scarf.

Show that there are 192 different combinations he can pick.

$$8 \times 6 \times 4 = 192 \checkmark$$

and = x  
or = +

[1]

(b) John thinks that if he picks **just two** of the three items of clothing there will be more than 192 combinations.

Is he correct?  
Show your reasoning.

$$\begin{aligned}
 & (sh \text{ and } h) \text{ or } (sh \text{ and } Sc) \text{ or } (h \text{ and } Sc) \\
 & (8 \times 6) + (8 \times 4) + (6 \times 4) \\
 & 48 + 32 + 24
 \end{aligned}$$

$$\begin{array}{r}
 48 \\
 +32 \\
 +24 \\
 \hline
 104
 \end{array}$$

$$104 < 192 \checkmark$$

[3]

- 8 Diners choose one starter and one main from the options given in the table below.  
Vegetarian dishes are indicated with a (v).

NL9

Starter	Main
Cheese salad (v)	Steak and chips
Prawn cocktail	Fish and chips
Mozzarella sticks (v)	Tomato pizza (v)
	Pork chops
	Nut cutlet (v)

- (a) Work out the fraction of all the meal combinations which have at least one vegetarian option.

(a) ..... [3]

- 8 Diners choose one starter and one main from the options given in the table below. Vegetarian dishes are indicated with a (v).

NL9

Starter	Main
Cheese salad (v)	Steak and chips
Prawn cocktail	Fish and chips
Mozzarella sticks (v)	Tomato pizza (v)
	Pork chops
	Nut cutlet (v)

V  
Veg  
NV  
Not veg

- (a) Work out the fraction of all the meal combinations which have at least one vegetarian option.

V, NV  
V, NV  
V, V  
V, NV  
V, V

NV, NV  
NV, NV  
NV, V  
NV, NV  
NV, V

V, NV  
V, NV  
V, V  
V, NV  
V, V

$$\frac{12}{15}$$

(a) ..... [3]

13 A menu has

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- 6 starters
- 10 main dishes
- 7 desserts.

(a) A three-course meal consists of a starter, a main dish and a dessert.

How many different three-course meals are possible?

(a) ..... [2]

(b) A two-course meal consists either of a starter with a main dish, a starter with a dessert or a main dish with a dessert.

Show that there are 172 possible different two-course meals. [3]

13 A menu has

- 6 starters
- 10 main dishes
- 7 desserts.

Created by W Neill

(a) A three-course meal consists of a starter, a main dish and a dessert.

How many different three-course meals are possible?

$$\begin{array}{ccccc} S & & M & & D \\ 6 & \times & 10 & \times & 7 \end{array}$$

$$420$$

(a) ..... [2]

$$\begin{array}{l} \text{and} = \times \\ \text{or} = + \end{array}$$

b)

$$\begin{array}{l} S \text{ and } M \text{ or } M \text{ and } D \text{ or } S \text{ and } D \\ (6 \times 10) + (10 \times 7) + (6 \times 7) \\ 60 + 70 + 42 \\ = 172 \checkmark \end{array}$$

(b) A two-course meal consists either of a starter with a main dish, a starter with a dessert or a main dish with a dessert.

Show that there are 172 possible different two-course meals.

[3]



Edexcel

**12** Cameron writes down one letter from the word **HOUR**.

Then he writes down one number from **5, 6** and **7**

(a) List all the possible combinations Cameron can write down.

N49

P23

(2)

(b) What is the probability that Cameron writes down **T7**?

P23

(1)

12 Cameron writes down one letter from the word **HOUR**.

Then he writes down one number from **5, 6** and **7**

(a) List all the possible combinations Cameron can write down.

N49

H5      O5      U5      R5

P23

H6      O6      U6      R6

H7      O7      U7      R7

(2)

(b) What is the probability that Cameron writes down **T7**?

P23

0

(1)

Video created by W Neill

- 7 Priti is going to have a meal.  
She can choose one starter and one main course from the menu.

<b>Menu</b>	
<b>Starter</b>	<b>Main Course</b>
Salad	Pasta
Fish	Rice
Melon	Burger

Write down all the possible combinations Priti can choose.

.....

.....

.....

**(Total for Question 7 is 2 marks)**

---

Video created by W Neill

- 7 Priti is going to have a meal.  
She can choose one starter and one main course from the menu.

Menu	
Starter	Main Course
Salad ✓	Pasta
Fish	Rice
Melon	Burger

Write down all the possible combinations Priti can choose.

SP, SR, SB

FP, FR, FB

MP, MR, MB

(Total for Question 7 is 2 marks)

7 Mohsin, Yusuf and Luke are going to play a game.

Video created by W Neill

N&9 At the end of the game, one of them will be in First place, one of them will be in Second place and one of them will be in Third place.

Use the table below to list all the possible outcomes of the game.

First place	Second place	Third place

7 Mohsin, Yusuf and Luke are going to play a game.

N&9 At the end of the game, one of them will be in First place, one of them will be in Second place and one of them will be in Third place.

Use the table below to list all the possible outcomes of the game.

First place	Second place	Third place
M	Y	L
M	L	Y
Y	M	L
Y	L	M
L	M	Y
L	Y	M



**14** A cafe owner sells 10 different types of sandwich.

Rayheem buys a different type of sandwich on Monday, on Tuesday and on Wednesday.

In how many ways can he do this?

.....  
**(Total for Question 14 is 2 marks)**

---



14 A cafe owner sells 10 different types of sandwich.

and = X

Rayheem buys a different type of sandwich on Monday, on Tuesday and on Wednesday.

In how many ways can he do this?

Mon and Tues and Wed

10 X 9 X 8

720

---

(Total for Question 14 is 2 marks)

**15** Alison has some shapes.

**N49** She has 14 red cubes and 10 red spheres.  
She has 12 black cubes and 8 black spheres.

Alison is going to select 2 of these shapes.

Of these 2 shapes

only 1 can be red  
only 1 can be black  
only 1 can be a cube  
and only 1 can be a sphere.

In how many ways can Alison select the 2 shapes?

.....  
(Total for Question 15 is 2 marks)

Video created by W Neill

15 Alison has some shapes.

N49 She has 14 red cubes and 10 red spheres.  
She has 12 black cubes and 8 black spheres.

Alison is going to select 2 of these shapes.

Of these 2 shapes

only 1 can be red  
only 1 can be black  
only 1 can be a cube  
and only 1 can be a sphere.



In how many ways can Alison select the 2 shapes?

$$\begin{array}{r} (14 \times 8) \text{ or } (10 \times 12) \\ 112 \quad + \quad 120 \quad = \quad \underline{232} \checkmark \end{array}$$

(Total for Question 15 is 2 marks)

**11** Jeff is choosing a shrub and a rose tree for his garden.

At the garden centre there are 17 different types of shrubs and some rose trees.

Jeff says,

“There are 215 different ways to choose one shrub and one rose tree.”

Could Jeff be correct?

You must show how you get your answer.

**(Total for Question 11 is 2 marks)**

**11** Jeff is choosing a shrub and a rose tree for his garden.

At the garden centre there are 17 different types of shrubs and some rose trees.

Jeff says,

“There are 215 different ways to choose one shrub and one rose tree.”

Could Jeff be correct?

You must show how you get your answer.

Shrub and Rose Tree

17

x

?

= 215

12.64?

As this is not a whole number you can't do this.

Jeff is incorrect.

**(Total for Question 11 is 2 marks)**

**15** Tracey is going to choose a main course and a dessert in a cafe.  
She can choose from 8 main courses and 7 desserts.

Tracey says that to work out the number of different ways of choosing a main course and a dessert you add 8 and 7

- (a) Is Tracey correct?  
You must give a reason for your answer.

.....  
.....  
(1)

12 teams play in a competition.  
Each team plays each other team exactly once.

- (b) Work out the total number of games played.

.....  
(2)

(Total for Question 15 is 3 marks)

- 15 Tracey is going to choose a main course and a dessert in a cafe.  
She can choose from 8 main courses and 7 desserts.

Tracey says that to work out the number of different ways of choosing a main course and a dessert you add 8 and 7

- (a) Is Tracey correct?

You must give a reason for your answer.

No, you need to multiply numbers together

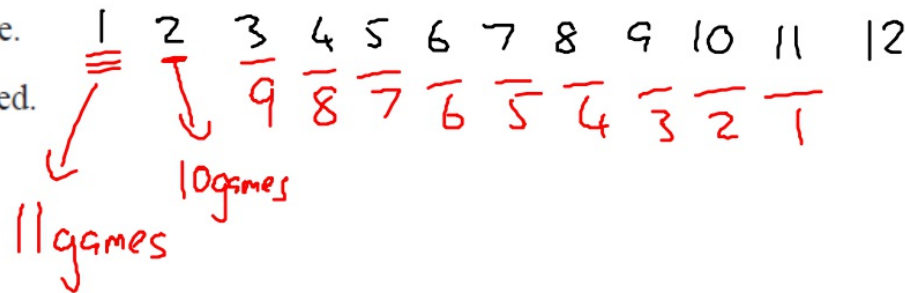
(1)

12 teams play in a competition.

Each team plays each other team exactly once.

- (b) Work out the total number of games played.

1 team



66 games ✓

(Total for Question 15 is 3 marks)



**14** There are 16 hockey teams in a league.

**Nk9** Each team played two matches against each of the other teams.

Work out the total number of matches played.

.....  

---

**(Total for Question 14 is 2 marks)**



14 There are 16 hockey teams in a league.

Nk9 Each team played two matches against each of the other teams.

Work out the total number of matches played.

A B C D E F G H I J K L M N O P

↓ ↓  
 15 x 2  
 = 30 matches  
 A → B

$$30 \text{ matches} \times 16 = 480 \text{ matches}$$


---


$$2$$

$$= 240 \checkmark$$

(Total for Question 14 is 2 marks)

**11** In a restaurant there are

9 starter dishes

**N49**

15 main dishes

8 dessert dishes

Janet is going to choose one of the following combinations for her meal.

a starter dish and a main dish

or a main dish and a dessert dish

or a starter dish, a main dish and a dessert dish

Show that there are 1335 different ways to choose the meal.

(Total for Question 11 is 3 marks)

11 In a restaurant there are

N49

- 9 starter dishes
- 15 main dishes
- 8 dessert dishes

Janet is going to choose one of the following combinations for her meal.

- a starter dish and a main dish
- or a main dish and a dessert dish
- or a starter dish, a main dish and a dessert dish

Show that there are 1335 different ways to choose the meal.

$$\begin{aligned} & \text{S and M} \quad \text{or} \quad \text{M and D} \quad \text{or} \quad \text{S and M and D} \\ & (9 \times 15) + (15 \times 8) + (9 \times 15 \times 8) \\ & 135 + 120 + 1080 = 1335 \end{aligned}$$

(Total for Question 11 is 3 marks)

AQA

9 In a game, three stars are hidden at random.

Each star is behind a different square on this board.

A B C D E

1					
2					
3					
4					
5					

9 (b)

In one game, the stars are behind three consecutive squares.

The squares are in one row or one column.

One of the squares is E2

Write down **all** the possible pairs for the other two squares.

N49

[2 marks]

N49

Answer \_\_\_\_\_

9 In a game, three stars are hidden at random.

Each star is behind a different square on this board.

	A	B	C	D	E
1					
2					★
3					
4					
5					

9 (b)

In one game, the stars are behind three consecutive squares.

The squares are in one row or one column.

One of the squares is E2

Write down **all** the possible pairs for the other two squares.

N49

N49

[2 marks]

E1 and E3

E3 and E4

C2 and D2 ✓

Answer \_\_\_\_\_

6 Gina makes a sandwich using

Video created by W Neill

N49

bread (B) or a roll (R)  
and  
ham (H) or cheese (C)  
and  
salad (S) or pickle (P)

6 (a) List **all** the possible types of sandwich Gina could make.  
One has been done for you.

[2 marks]

B H S

6 (b) What **fraction** of the possible types of sandwich have cheese **and** pickle?

[1 mark]

Answer \_\_\_\_\_

6

Gina makes a sandwich using

Video created by W Neill

N49

bread (B) or a roll (R)

and

ham (H) or cheese (C)

and

salad (S) or pickle (P)

- 6 (a) List **all** the possible types of sandwich Gina could make.  
One has been done for you.

[2 marks]

BHS

BCP

RHS

RCS

BHP

RHP

RCP ✓

BCS

- 6 (b) What **fraction** of the possible types of sandwich have cheese **and** pickle?

[1 mark]

Answer  $\frac{2}{8}$  or  $\frac{1}{4}$  ✓



**9 (b)** Ted puts songs A, B and C on shuffle play.

**N49** List all the possible orders of songs A, B and C.  
One has been done for you.

**[2 marks]**

A B C

9 (b) Ted puts songs A, B and C on shuffle play.

N49 List all the possible orders of songs A, B and C.  
One has been done for you.

[2 marks]

A B C

B A C

C A B

A C B

B C A

C B A

21 Here are five number cards.

N49  
P21



Two of the five cards are picked at random.

Work out the probability that the total of the two numbers is **more than 30**

**[3 marks]**

Answer \_\_\_\_\_

21

Here are five number cards.

Video created by W Neill

N49

P21



Two of the five cards are picked at random.

Work out the probability that the total of the two numbers is **more than 30**

[3 marks]

$$17 + 12$$

$$17 + 23$$

$$17 + 15$$

$$17 + 16$$

$$12 + 23$$

$$12 + 15$$

$$12 + 16$$

$$23 + 15$$

$$23 + 16$$

$$15 + 16$$

$$\frac{7}{10}$$

Answer \_\_\_\_\_

8 Lena is at the gym.

8 (a) She will use each of these pieces of equipment once.

N49

Rowing machine (R)      Stepper (S)

Treadmill (T)      Bike (B)

Lena will use the rowing machine **first**.

List all the possible orders in which she could use the four pieces of equipment.

**[2 marks]**

8 Lena is at the gym.

8 (a) She will use each of these pieces of equipment once.

N49

Rowing machine (R)

Stepper (S)

Treadmill (T)

Bike (B)

Lena will use the rowing machine first.

List all the possible orders in which she could use the four pieces of equipment.

R S T B

R B S T

[2 marks]

R S B T

R B T S

R T S B

R T B S

15

N49

**Meal Deal**

Choose one sandwich, one drink and one snack

There are

7 different sandwiches

5 different drinks

and

3 different snacks.

15 (a) How many different Meal Deal combinations are there?

**[2 marks]**

N49

Answer \_\_\_\_\_

15

N49

**Meal Deal**

Choose one sandwich, one drink and one snack

There are

7 different sandwiches

5 different drinks

and

3 different snacks.

15 (a) How many different Meal Deal combinations are there?

[2 marks]

N49

$$7 \times 5 \times 3$$

Answer

105



17

Here are two methods to make a 4-digit code.

Video created by W Neill

N49

Codes can have repeated digits.

**Method A**

For the first two digits use an odd number between 30 and 100

For the last two digits use a multiple of 11

**Method B**

Use four digits in the order even odd even odd

Do **not** use the digit zero

Which method gives the **greater** number of possible codes?

You **must** show your working.

[3 marks]

Answer \_\_\_\_\_

17

Here are two methods to make a 4-digit code.

Video created by W Neill

N49

Codes can have repeated digits.

**Method A**

For the first two digits use an odd number between 30 and 100

For the last two digits use a multiple of 11

**Method B**

Use four digits in the order even odd even odd

Do **not** use the digit zero

Which method gives the **greater** number of possible codes?

You **must** show your working.

1 2 3 4 5 6 7 8 9

Method A

9 9      

31 ~~##~~ 11      11 → 99  
33  
35 (5) 7x5      9  
37 = 35 x  
39              35x9  
                 = 315

Method B

4 x 5 x 4 x 5  
= 400

Answer Method B 400 > 315

19

N49  
R5

**Lunch**

Choose one starter and one main course

There are four starters and ten main courses to choose from.

Two of the starters and three of the main courses are suitable for vegans.

What percentage of the possible lunches have **both** courses suitable for vegans?

**[3 marks]**

Answer \_\_\_\_\_ %

19

N49  
R5**Lunch**

Choose one starter and one main course

There are four starters and ten main courses to choose from.

Two of the starters and three of the main courses are suitable for vegans.

What percentage of the possible lunches have **both** courses suitable for vegans?

**[3 marks]**

S	and	Main		
4	X	10	=	40
2	X	3	=	6

$\frac{6}{40}$  vegans

Answer \_\_\_\_\_  $15\%$  ✓ %