

The Farey Sequence

John Farey was born in 1766 and died in 1826.

He was a geologist and a writer.

John Farey investigated sequences of fractions written in order of size.

He noticed something special about a sequence that is now called the Farey Sequence.

The first Farey Sequence,

F₁ looks like this: $\frac{0}{1}, \frac{1}{1}$

F₂ looks like this: $\frac{0}{1}, \frac{1}{2}, \frac{1}{1}$

F₃ looks like this: $\frac{0}{1}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{1}{1}$

F₄ looks like this: $\frac{0}{1}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{1}{1}$

Write down **F₅** in the spaces below:

—	—	—	—	—	—	—	—	—	—	—
---	---	---	---	---	---	---	---	---	---	---

Write down **F₆** in the spaces below:

—	—	—	—	—	—	—	—	—	—	—	—	—
---	---	---	---	---	---	---	---	---	---	---	---	---

Look back over the sequences.

Circle the fraction in **F₂** which wasn't in **F₁**

Circle the fractions in **F₃** which weren't in **F₂**

Circle the fractions in **F₄** which weren't in **F₃** and so on.

Can you see a connection between each circled fraction and the fractions either side?

Describe the connection in the box below.

Remember to take your homework to school to show your teacher, then you can take it home and play the games again.

Hint:

First look at the numerators, then at the denominators.

Fractions, Decimals and Percentages

Name

The games and activities on this homework sheet will help your child practise:

- solving percentage problems
- ordering decimals less than one
- investigating fraction sequences

When parents take an interest in their children's work, those children often feel more confident in class. You can help your child's progress by doing these activities together and talking with them about the maths involved.

Special offer

Five friends see this special offer:

They share the total cost of the cards like this:

First Sam puts in £10

Next, of the remainder, Daisy puts in 50% and James 30%

Finally Stephen and Oliver work out what's left and split it between them.

How much money do they each put in?



How many packs should each child receive?

Hint:

Make sure the number of packs they receive is in proportion to the amount they contributed.

Paper trail

a game for 2 players

You need

- two coloured pencils
- 16 small pieces of paper or sticky notes

Before you start

- choose who has which colour pencil
- decide which player goes first

First player

- choose a number from the grid
- write the number on one of the pieces of paper using your pencil and put it on the table in front of you

Take turns to

- choose a number from the grid and write it on one of the pieces of paper
- put it on the table so that the numbers are in order of size, smallest first

Keep taking turns until you have used all 16 numbers.

Copy the numbers onto the path in order of size. Each person write their own numbers using their colour.

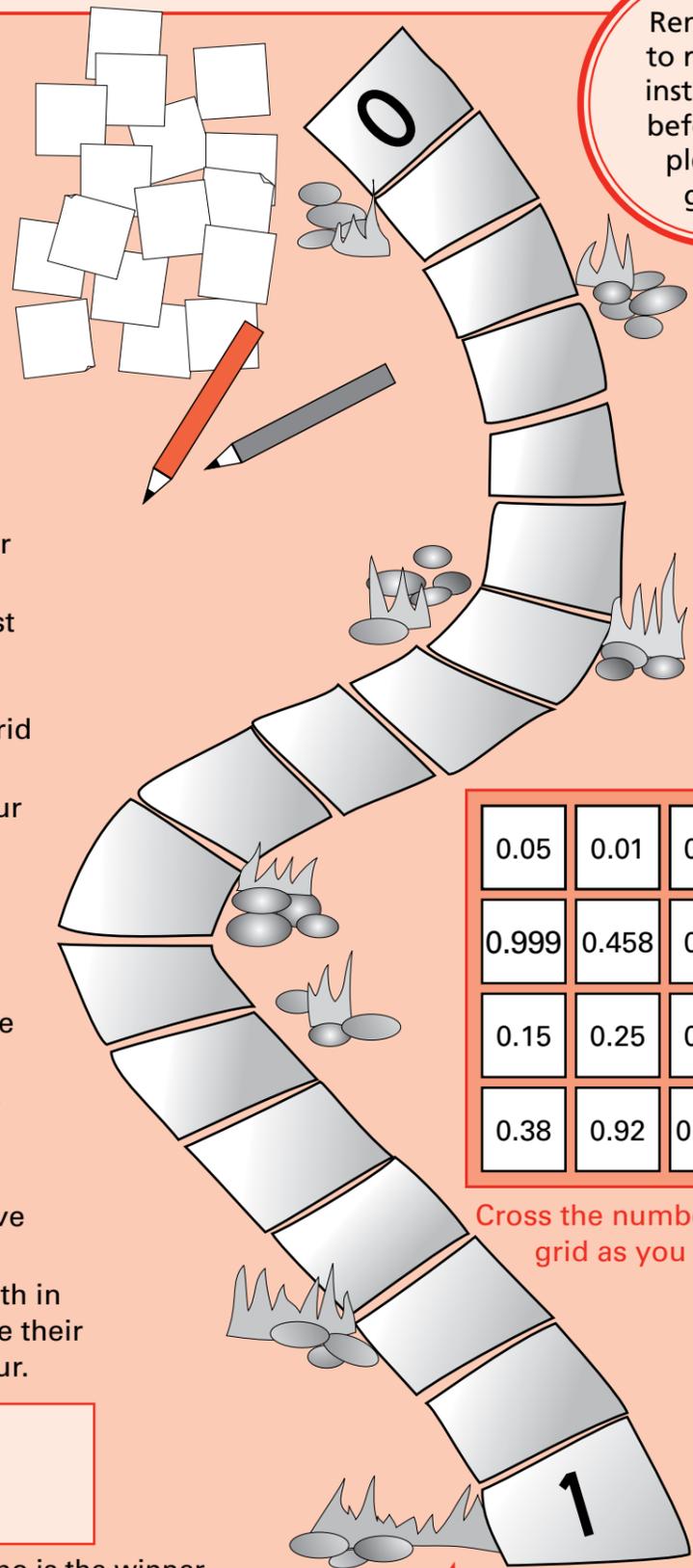
Points:

- 2 numbers in a row = 2 points
- 3 numbers in a row = 5 points

Add up the points to find out who is the winner.

Other things to try

- Try to work out a winning strategy.
- Use a different set of numbers to make the game more difficult (you could use numbers with four decimal places or negative numbers).



0.05	0.01	0.67	0.9
0.999	0.458	0.58	0.5
0.15	0.25	0.06	0.86
0.38	0.92	0.025	0.75

Cross the numbers off the grid as you use them.

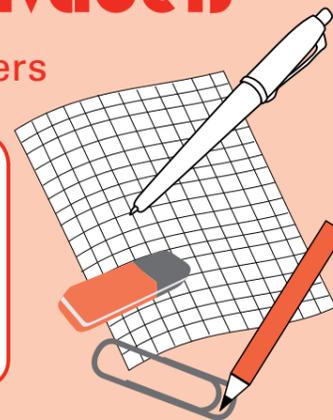
Remember to read the instructions before you play the game

Number invaders

a game for 2 players

You need

- a paper clip
- a pencil and a pen
- a rubber
- squared paper



Before you start

- use the pen to outline a 10 by 10 grid on the squared paper
- decide who is going first

First player

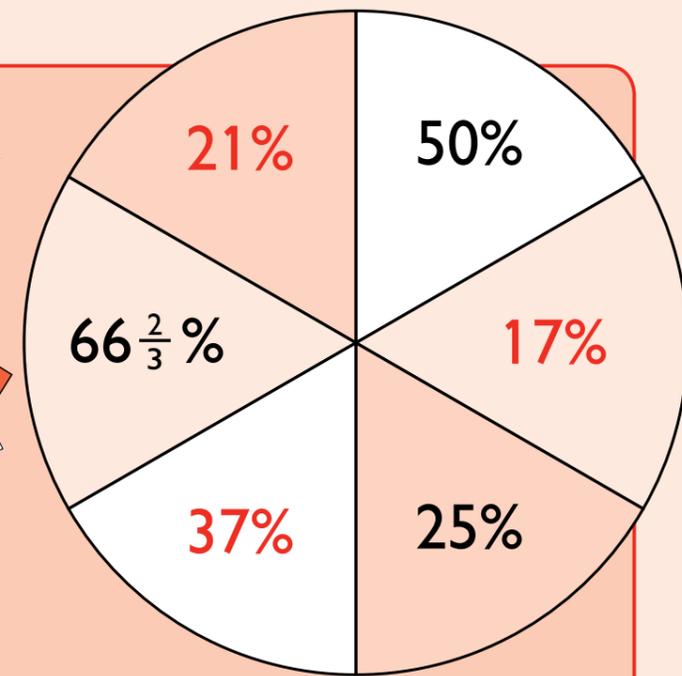
- spin the spinner until you get a red number
- using the pencil, shade in that many squares on the grid

Take turns to

- spin the spinner
- if you spin a red number, shade in that many squares on the grid
- if you spin a black number, remove that percentage of the shaded squares
- if the answer is not a whole number, miss a turn!

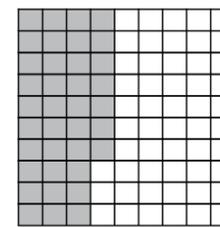
The player who shades in the last square is the winner.

You don't need the exact number of squares to win.



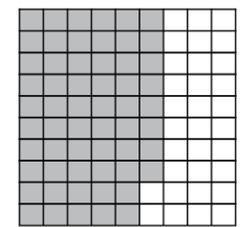
Sample game

Niamh spins **37%** and shades in 37 squares:



Shaded squares: 37

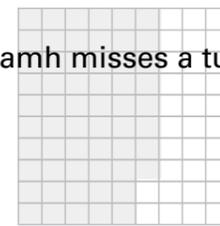
Daniel spins **21%** and shades in 21 squares:



Shaded squares: 58

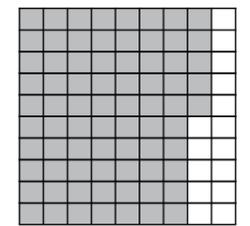
Niamh spins **25%**
25% of 58 is 14.5

Niamh misses a turn



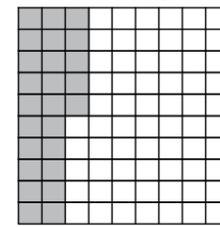
Shaded squares: 75

Daniel spins **17%** and shades in 17 squares:



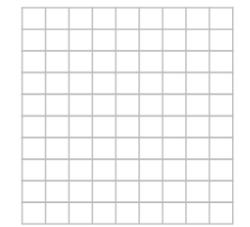
Shaded squares: 92

Niamh spins **66 2/3%** and rubs out 50 squares:



Shaded squares: 42

and so on...



Other things to try

- Improve the game by changing the numbers in the spinners.

I played the games

with _____

Signed _____