Name: Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Farey Sequences Autumn 1 – Week 3 – Extension 3**

A man called John Farey investigated sequences of fractions in order of size - they are called Farey Sequences.

The third Farey Sequence, F3, looks like this:

It lists in order all the fractions between 0  and 1 , in their simplest forms, with denominators up to and including 3 .

Here is F4:



Write down F5  .

Which extra fractions are in F5 which weren't in F4?

Use F5 to help you complete F6 and F7.
F6

F7

**Questions:**
There are lots of extra fractions in F11 which are not in F10.
There are only a few extra fractions in F12  which are not in F11.
Can you explain why this is the case?

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When will you need lots of extra fractions to get the next Farey Sequence?
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Will every Farey Sequence be longer than the one before? How do you know?
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So far, all the Farey Sequences have contained an odd number of fractions. Can you find a Farey Sequence with an even number of fractions?
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