Activity sheet

The Book of Sand

Suppose that the Book of Sand has the following properties:

- Each sheet has a sheet immediately before it and one immediately after it.
- Given two book sheets, one can always get from one to the other by turning pages.

Activity 1

Let us consider the sheets of the Book of Sand as if they were numbers so that:

- Each sheet corresponds to a different number.
- If one sheet is before another, a smaller number corresponds to it.

Is it possible to do this using **whole numbers**? Justify.

Actividad 2

As in the previous activity, let us consider the pages of the Book of Sand as if they were numbers so that:

- Each sheet corresponds to a different number.
- If one sheet is before another, a smaller number corresponds to it.

Is it possible to do this using **integer numbers**? Justify.

Activity 3

Let us now think of an imaginary book in which all its pages can be labeled in the following way:

- We open this book on any page, and we assign it 1, to the previous one the number $\frac{1}{2}$, to the one before that the number $\frac{1}{3}$, and so on.
- With this procedure, we label only the sheet we chose and the previous ones. Later, we will see how to label the subsequent sheets.

Answer the following questions:

1. How many sheets are there between the sheet labeled with the number $\frac{1}{10}$ and the sheet labeled with the number $\frac{1}{2}$, both included?
2. If $m > n$, both whole numbers, which sheet comes before, the one labeled $\frac{1}{n}$ or the one labeled $\frac{1}{m}$?
3. Does this book have a first sheet?
4. If we label the front cover, what number would be appropriate to assign it?

Activity 4

Let us continue labeling the sheets of the book from the previous activity as follows:

To the sheet following the one that we labeled with 1, we give the number $2 - \frac{1}{2} = \frac{3}{2}$, which is followed by $2 - \frac{1}{3}$, that is $\frac{5}{3}$, which is followed by $2 - \frac{1}{4}$, that is $\frac{7}{4}$, and so on.

Answer the following questions:

1. If we count 10 sheets starting from the one labeled with the number 1, what label does that sheet have?
2. How many sheets are there between the sheet labeled $\frac{1}{2}$ and the sheet labeled $\frac{9}{5}$, including both?
3. Does this book have a last sheet?
4. If we label the back cover, what number would be appropriate to assign it?