Answer on Question #62450 – Math – Discrete Mathematics

Question

Given:

$$M = \left\{\frac{1}{3}, \frac{1}{2}, \frac{3}{5}, \frac{2}{3}, \frac{5}{7}, \ldots\right\}$$

Write: in the set builder form

Solution

The problem has more than one solution.

Example 1.

We have to reduce to a common denominator all fractions

So $d = 5 \cdot 7 \cdot 3 \cdot 2 = 30 \cdot 7 = 210$

Then:

$$\frac{1}{3} = \frac{70}{210}$$

$$\frac{1}{2} = \frac{105}{210}$$

$$\frac{3}{5} = \frac{126}{210}$$

$$\frac{2}{3} = \frac{140}{210}$$

$$\frac{5}{7} = \frac{150}{210}$$

So we obtain

$$\frac{1}{3} < \frac{1}{2} < \frac{3}{5} < \frac{2}{3} < \frac{5}{7}.$$

We can see that the difference between the denominator and the numerator for numbers at the odd position is 2.

We can see that the difference between the denominator and the numerator for numbers at the even position is 1.

In the set builder form

$$M = \left\{\frac{2n-1}{2n+1}, \frac{n}{n+1} : \ n = 1, 2, 3, \ldots\right\}.$$

Answer: In the set builder form

$M = \left\{\frac{2n-1}{2n+1}, \frac{n}{n+1} : \ n = 1, 2, 3, \ldots\right\}.$

Example 2.

$\frac{1}{3}$

$\frac{1}{2} = \frac{2}{4}$

$\frac{3}{5}$

$\frac{2}{3} = \frac{4}{6}$

$\frac{5}{7}$

We can see that in all cases the difference between the denominator and the numerator is 2.

In the set builder form

$$M = \left\{\frac{n}{n+2} : \ n = 1, 2, 3, \ldots\right\}.$$

Answer: In the set builder form

$M = \left\{\frac{n}{n+2} : \ n = 1, 2, 3, \ldots\right\}.$