1 Numbers with Repeating Digits

Is the following inequality true:

a) $0,(123) < 0,1(23)$;

b) $0,(2423) < 0,24(23)$;

c) $0,(423) < 0,4(23)$;

d) $0,1(23) < 0,124$?

2 Solution

To assess the truth of the given inequalities, let's convert the repeating decimals into fractions or estimate their decimal values.

2.1 a) $0,(123) < 0,1(23)$

$0,(123) = 0.123123123...$ and $0,1(23) = 0.1+0.0(23) = 0.1+0.0232323... \approx 0.1232323...$

Comparison:

$$0.123123... < 0.123232... \quad \text{– True}$$

2.2 b) $0,(2423) < 0,24(23)$

$0,(2423) = 0.242324232423...$ and $0,24(23) = 0.24+0.0(23) = 0.24+0.0232323... \approx 0.2423232323...$

Comparison:

$$0.24232423... < 0.24232323... \quad \text{– False}$$

2.3 c) $0,(423) < 0,4(23)$

$0,(423) = 0.423423423...$ and $0,4(23) = 0.4+0.0(23) = 0.4+0.0232323... \approx 0.423232323...$

Comparison:

$$0.423423... < 0.42323232... \quad \text{– False}$$

2.4 d) $0,1(23) < 0,124$

$$0,1(23) = 0.1232323...$$

Comparison:

$$0.12323232... < 0.124 \quad \text{– True}$$