THREE CIRCUITS' INSULATION RESISTANCE IN PARALLEL

200, 50 AND 40 MEGOHMS TOGETHER. WHAT READS?

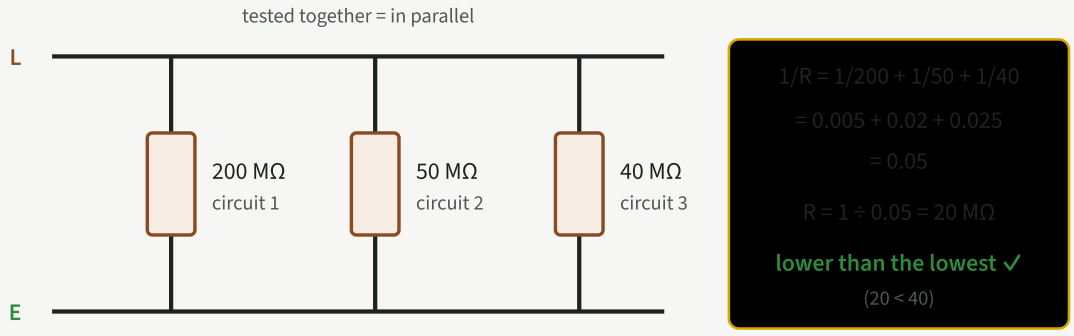
The scenario for Q15 During a periodic, three circuits are insulation resistance tested. Each reads the same live–live and live–earth: circuit 1 = **200 MΩ**, circuit 2 = **50 MΩ**, circuit 3 = **40 MΩ**.

Q15Calculation

What would you read if all three circuits were tested **together**?

Answer: **20 MΩ**.

Testing circuits together puts their insulation **in parallel**. **Golden rule:** the total of resistances in parallel is **always lower than the lowest** one. The lowest here is **40 MΩ**, so anything above that is out straight away, including **290 MΩ**, which is just the three added together. If only one option is below the lowest, that's your answer. Otherwise, work it out.



Resistances in parallel always give a total lower than the smallest one. Adding them (290 MΩ) is the series answer, and it's wrong here.

METHOD 1: THE X⁻¹ BUTTON (QUICKEST)

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200 x⁻¹  +  50 x⁻¹  +  40 x⁻¹  =   → 1/20 (S⇔D → 0.05)
Ans x⁻¹  =                      → 20

Don't stop at 0.05! That's 1/R. Press x⁻¹ once more.
Answer: 20 MΩ
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METHOD 2: THE LONG WAY
1 ÷ 200 = 0.005
1 ÷ 50  = 0.02
1 ÷ 40  = 0.025
0.005 + 0.02 + 0.025 = 0.05
1 ÷ 0.05 = 20 MΩ
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Finding x^{-1}

On older Casios it's a labelled key next to sin. On newer Casios it's awkward: you press **SHIFT** and the key directly under the D-pad, and it isn't clearly labelled. Use the **S⇔D** key to change a fraction to a decimal.

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