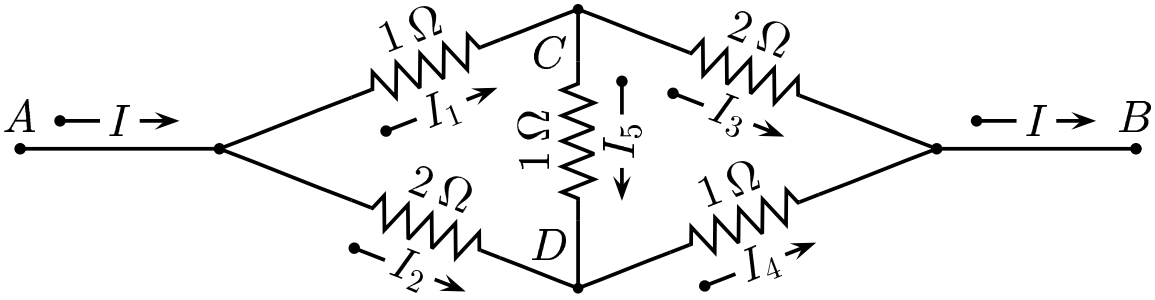
The current enters at A and leaves at B.



Determine the ratio $\dfrac{I_2}{I_1}$.

A) $\dfrac{I_2}{I_1} = \dfrac{1}{2}$

B) $\dfrac{I_2}{I_1} = \dfrac{1}{3}$

C) $\dfrac{I_2}{I_1} = \dfrac{2}{3}$

D) $\dfrac{I_2}{I_1} = 1$

Hint: From symmetry, $I_1 = I_4$. Then for the junction equation $I_5 = I_4 - I_2 = I_1 - I_3$. Write down the loop equation for $ACDA$.

The left-hand loop equation is

$$
\begin{aligned}
-I_1\,(1\,\Omega) - I_5\,(1\,\Omega) + I_2\,(2\,\Omega) &= 0 \\
-I_1\,(1\,\Omega) - (I_4 - I_2)\,(1\,\Omega) + 2\,I_2\,(1\,\Omega) &= 0 \\
-I_1\,(1\,\Omega) - I_4\,(1\,\Omega) + I_2\,(1\,\Omega) + 2\,I_2\,(1\,\Omega) &= 0 \\
-I_1\,(1\,\Omega) - I_1\,(1\,\Omega) + 3\,I_2\,(1\,\Omega) &= 0 \\
-2\,I_1\,(1\,\Omega) + 3\,I_2\,(1\,\Omega) &= 0 \\
+3\,I_2\,(1\,\Omega) &= 2\,I_1\,(1\,\Omega) \\
\frac{I_2}{I_1} &= \frac{2\,(1\,\Omega)}{3\,(1\,\Omega)} \\
&= \frac{2}{3}\,.
\end{aligned}
$$

Answer **C**.

28.03-06a˙Two˙Loop˙Network 2004-3-24