



25. Which of the following is equal to $\frac{1}{\sqrt{2005 + \sqrt{2005^2 - 1}}}$?
- A $\sqrt{1003} - \sqrt{1002}$ B $\sqrt{1005} - \sqrt{1004}$ C $\sqrt{1007} - \sqrt{1005}$
D $\sqrt{2005} - \sqrt{2003}$ E $\sqrt{2007} - \sqrt{2005}$

0595



©UKMT

25. A
$$\begin{aligned} \frac{1}{\sqrt{2005 + \sqrt{2005^2 - 1}}} &= \frac{1}{\sqrt{1003 + 1002 + \sqrt{(2005 + 1)(2005 - 1)}}} \\ &= \frac{1}{\sqrt{(\sqrt{1003})^2 + 2\sqrt{1003}\sqrt{1002} + (\sqrt{1002})^2}} = \frac{1}{\sqrt{(\sqrt{1003} + \sqrt{1002})^2}} = \frac{1}{\sqrt{1003} + \sqrt{1002}} \\ &= \frac{(\sqrt{1003} - \sqrt{1002})}{(\sqrt{1003} - \sqrt{1002})(\sqrt{1003} + \sqrt{1002})} = \frac{(\sqrt{1003} - \sqrt{1002})}{1003 - 1002} = \sqrt{1003} - \sqrt{1002}. \end{aligned}$$