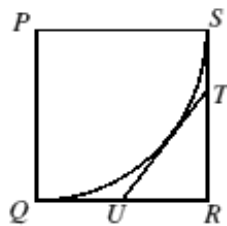24. The diagram shows a square $PQRS$. The arc QS is a quarter circle. The point U is the midpoint of QR and the point T lies on SR. The line TU is a tangent to the arc QS. What is the ratio of the length of TR to the length of UR?

A $3:2$ B $4:3$ C $5:4$ D $7:6$ E $9:8$

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24. **B** Let the square have side-length 2, $RT = h$ and let A be the point of contact between TU and the circle. Two tangents to a circle which meet at a point are of equal length. So as $QU = 1$ so does AU. Similarly $TA = TS = 2 - h$. Applying Pythagoras' Theorem to triangle URT gives $1^2 + h^2 = (1 + 2 - h)^2$ so $1 + h^2 = 9 - 6h + h^2$ and therefore $8 - 6h = 0$ which gives $h = \frac{4}{3}$. The required ratio is then $4 : 3$.