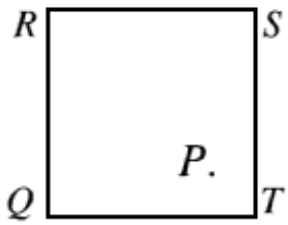
20. A point P is chosen at random inside a square $QRST$. What is the probability that $\angle RPQ$ is acute?

A $\frac{3}{4}$ B $\sqrt{2}-1$ C $\frac{1}{2}$ D $\frac{\pi}{4}$ E $1-\frac{\pi}{8}$



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20. E If $\angle RPQ = 90°$ then P lies on a semicircle of diameter RQ.
Let x be the side-length of the square $QRST$.
Hence the area of the semicircle $RPQ = \frac{1}{2}\pi\left(\frac{1}{2}x\right)^2 = \frac{1}{8}\pi x^2$ and the area of square $QRST$ is x^2.
$\angle RPQ$ is acute when P is outside the semicircle RPQ.

Hence the probability that $\angle RPQ$ is acute is $\dfrac{x^2 - \frac{1}{8}\pi x^2}{x^2} = 1 - \dfrac{\pi}{8}$.