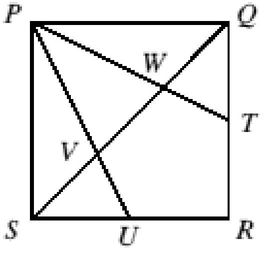
23. *PQRS* is a square. The points *T* and *U* are the midpoints of *QR* and *RS* respectively. The line *QS* cuts *PT* and *PU* at *W* and *V* respectively. What fraction of the area of the square *PQRS* is the area of the pentagon *RTWVU*?



A $\frac{1}{3}$ B $\frac{2}{5}$ C $\frac{3}{7}$ D $\frac{5}{12}$ E $\frac{4}{15}$

23. **A** The pentagon *RTWVU* is the remainder when triangles *SUV* and *WTQ* are removed from the bottom right half of the square. Draw in the diagonal *PR* and consider the triangle *PRS*. The medians of triangle *PRS* join each vertex *P*, *R* and *S* to the midpoint of its opposite side, i.e. *P* to *U* and *S* to the middle of the square. The medians intersect at *V* and therefore the height of *V* above *SR* is $\frac{1}{3}$ of *PS*.
The area of triangle *SUV* is therefore $\frac{1}{2} \times \frac{1}{2}SR \times \frac{1}{3}PS = \frac{1}{12}$ of the area of the square. By symmetry, this is also the area of triangle *WTQ*. The area of the pentagon *RTWVU* is then $\frac{1}{2} - \left(\frac{1}{12} + \frac{1}{12}\right) = \frac{1}{3}$ of the area of the square *PQRS*.