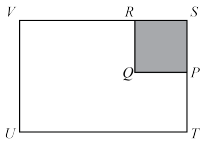



# Problem of the Week
## Problem D and Solution
## Cutting the Corner

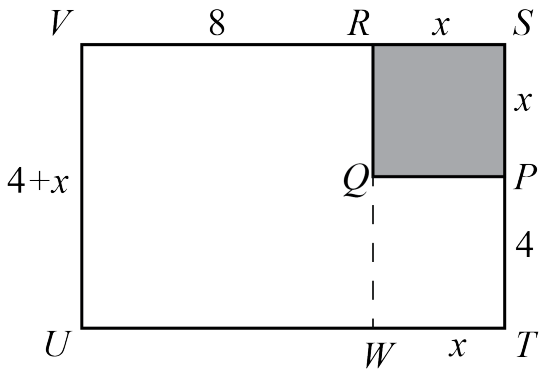
### Problem

Rectangle $STUV$ has $P$ on $ST$, $R$ on $SV$, and $Q$ inside the rectangle such that $PQRS$ is a square. When square $PQRS$ is removed from rectangle $STUV$, the remaining shape has an area of 92 m$^2$.

If $PT = 4$ m and $RV = 8$ m, what is the area of rectangle $STUV$?

### Solution

Let $x$ represent the side length of square $PQRS$. In the diagram, extend $RQ$ to intersect $TU$ at $W$. This creates rectangle $PTWQ$ and rectangle $RWUV$. Also, $UV = PT + SP = (4 + x)$ m and $TW = RS = x$ m.




We are given that area $PTWQ$ + area $RWUV = 92$ m$^2$. That is,

$$\begin{aligned} PT \times TW + RV \times UV &= 92 \\ 4x + 8(4 + x) &= 92 \\ 4x + 32 + 8x &= 92 \\ 12x + 32 &= 92 \\ 12x &= 60 \\ x &= 5 \end{aligned}$$

Thus, $x = 5$ m, and so $SV = 8 + x = 13$ m, and $UV = 4 + x = 9$ m.

Therefore, the area of rectangle $STUV$ is $SV \times UV = 13 \times 9 = 117$ m$^2$.