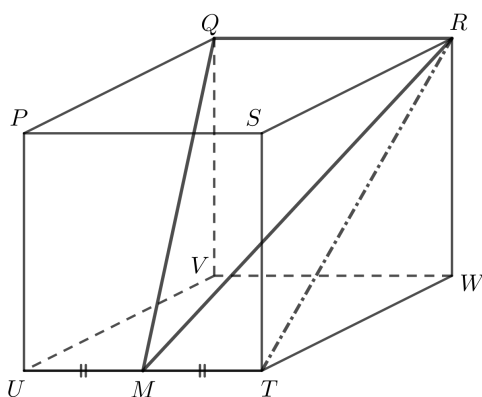# Problem of the Week
Problem D and Solution
Halfway to the Other Side

Problem

Cube $PQRSTUVW$ has side length 2. Point M is the midpoint of edge UT. Determine the area of $\triangle MQR$.

Solution

We first draw RT.

In $\triangle RWT$, $\angle RWT = 90°$ and $RW = WT = 2$.

By the Pythagorean Theorem in $\triangle RWT$, $RT^2 = RW^2 + WT^2 = 2^2 + 2^2 = 8$.

Therefore, $RT = \sqrt{8}$, since $RT > 0$.

$\triangle MQR$ has base equal to the length of QR, which is 2.

Notice that the height of $\triangle MQR$ is equal to the distance from side QR of the cube to side UT of the cube, which is equal to the length of RT or $\sqrt{8}$.

Therefore, area of $\triangle MQR = \dfrac{\text{base} \times \text{height}}{2} = \dfrac{2 \times \sqrt{8}}{2} = \sqrt{8}$ units squared.