Problem of the Week
Problem A and Solution
Dog Walking

Problem

Petra walks his dog once a day. Most days when Petra walks his dog, he takes a route that is $3\frac{1}{2}$ km long. When it is raining, he does a shorter walk which is only 2 km long.

One week it rained for 3 days and did not rain on the other 4 days. How far did Petra walk his dog that week?

Solution

On each of the 3 days it rained, Petra walked 2 km for a total of $2 + 2 + 2 = 6$ km.

On each of the 4 days it did not rain, Petra walked $3\frac{1}{2}$ km.
We know that $3\frac{1}{2}$ is the same as $3 + \frac{1}{2}$, so over four days, the total distance Petra walked is equal to $3 + \frac{1}{2} + 3 + \frac{1}{2} + 3 + \frac{1}{2} + 3 + \frac{1}{2}$.

Collecting the whole numbers and the fractions, we can rewrite this as
$3 + 3 + 3 + 3 + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$.
Since $\frac{1}{2} + \frac{1}{2} = 1$, we can rewrite this as $3 + 3 + 3 + 3 + 1 + 1 = 14$ km.

Alternatively, to calculate the distance Petra walked on the days it did not rain, we can add $3\frac{1}{2} + 3\frac{1}{2} = 7$ km which is how far Petra walked in two days. So he walked twice as far in four days, which is $7 \times 2 = 14$ km.

So the total distance Petra walked that week is $6 + 14 = 20$ km.

Alternatively, we can do the calculation in metres.
Since we know that 1 km is equal to 1000 m, then $\frac{1}{2}$ km is equal to 500 m.
So $3\frac{1}{2}$ km is equal to $3 \times 1000 + 500 = 3500$ m and 2 km is equal to $2 \times 1000 = 2000$ m.

This means the total distance Petra walked is equal to
$2000 + 2000 + 2000 + 3500 + 3500 + 3500 + 3500 = 20000$ m, which is 20 km.