



Problem of the Week

Grade 9 and 10

The Storms Are Coming

Solution

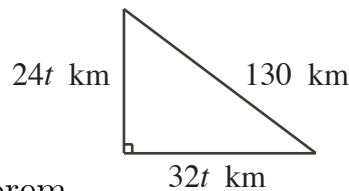
Problem

Gail and Dusty Storm went cycling on their own from the same place at 1:15 p.m. Gail Storm travelled north at 24 km/h while Dusty Storm travelled east at 32 km/h. Determine the time when Gail and Dusty will be 130 km apart and how far each of them will have travelled.

Solution

Let t be the length of time, in hours, that Gail and Dusty travel until they are 130 km apart. Since Gail is travelling at 24 km/h, she will travel $24t$ km in t hours. Since Dusty is travelling at 32 km/h, he will travel $32t$ km in t hours.

Since Gail is travelling north and Dusty is travelling east, they are travelling at right angles to each other. We can represent the distances on the following right triangle.



Using the Pythagorean Theorem

$$\begin{aligned}(24t)^2 + (32t)^2 &= 130^2 \\ 576t^2 + 1024t^2 &= 16900 \\ 1600t^2 &= 16900 \\ 16t^2 &= 169 \\ t^2 &= \frac{169}{16}\end{aligned}$$

Since $t > 0$, $t = \frac{13}{4} = 3.25 = 3$ hours and 15 minutes.

Then $24t = 24 \times \frac{13}{4} = 78$ and $32t = 32 \times \frac{13}{4} = 104$. Also, 3 h 15 min after 1:15 p.m. is 4:30 p.m.

Therefore at 4:30 p.m. Gail and Dusty are 130 km apart. Gail travelled 78 km and Dusty travelled 104 km.

