Problem of the Week
Problem D and Solution
Layover Between the Trips

Problem
A plane travels from Calgary, AB to Grande Prairie, AB. The total flight time, including takeoff and landing, is 1 hour and 40 minutes. The return flight takes the same route and time. The average speed for these two flights is 500 km/h.

After a brief layover in Grande Prairie, the average speed of this entire round trip (including the two flights and the layover in between) becomes 425 km/h. How long was the layover?

Solution
Let \( t \) be the length of the layover, in hours.

The plane travels from Calgary to Grande Prairie in 1 hour 40 minutes at a speed of 500 km/h. Using the formula distance = speed \( \times \) time, the distance from Calgary to Grande Prairie must be \( 500 \times \frac{5}{3} \) km.

Therefore, for the two-way trip, the plane travels \( 2 \times \frac{5000}{3} = \frac{5000}{3} \) km.

The length of time of the entire two-way trip is the time of the two flights plus the layover time. Therefore, the total length of time of the trip is \( \frac{5}{3} + \frac{5}{3} + t = \frac{10}{3} + t \) hours.

Since the average speed of the entire two-way trip is 425 km/h, using the formula distance = speed \( \times \) time, we have

\[
\frac{\frac{5000}{3}}{425} = 425 \times \left( \frac{10}{3} + t \right)
\]

\[
\frac{10}{3} + t = \frac{5000}{3 \times 425}
\]

\[
t = \frac{200}{51} - \frac{10}{3}
\]

\[
= \frac{200}{51} - \frac{170}{51}
\]

\[
= \frac{10}{17}
\]

Therefore, the layover was \( \frac{10}{17} \) hours, or approximately 35 minutes.