

Answer on Question #64189 – Math – Algebra

Question

It takes Sata 5 minutes to fly 35 miles with the wind. It takes him 7 minutes to fly 35 miles against the wind. Determine the speed of Santa's sleigh in the air(x) and the speed of the wind(y).

Solution

If x is the speed of Santa's sleigh in air, y is the speed of the wind, $S = 35$ miles,

$t_1 = 5$ minutes is time to fly with the wind, $t_2 = 7$ minutes is time to fly against the wind, then we get the system of two equations:

$$\begin{cases} (x + y)t_1 = S, \\ (x - y)t_2 = S; \end{cases}$$

$$\begin{cases} 5x + 5y = 35, \\ 7x - 7y = 35; \end{cases}$$

Divide the first equation by 5, divide the second equation by 7:

$$\begin{cases} x + y = 7, \\ x - y = 5; \end{cases}$$

Add the first and the second equations, subtract the second equation from the first equation:

$$\begin{cases} (x + y) + (x - y) = 7 + 5, \\ (x + y) - (x - y) = 7 - 5; \end{cases}$$

Simplify

$$\begin{cases} 2x = 12, \\ 2y = 2; \end{cases}$$

Divide the first equation by 2, divide the second equation by 2:

$$\begin{cases} x = 6, \\ y = 1; \end{cases}$$

Thus, the speed of Santa's sleigh in air is 6 miles per minute and the speed of the wind is 1 mile per minute.

Answer:

The speed of Santa's sleigh in air is $x=6$ miles per minute and the speed of the wind is $y =1$ mile per minute.