Wind and Water Current Problems

Unfortunately, this is where the "fun" begins. These are one of the few problems where two variables are typically used. One variable will represent the speed (rate) of the vehicle (boat or plane), and the other variable represents the speed (rate) of the current (wind or water).

Key points: Going with the current *adds* the speed of the current. Going against the current *subtracts* the speed of the current. Example: If a boat is traveling 12 mph downstream and the current is 5 mph, what is the speed of the boat? (12 + 5)...However, if the boat is traveling upstream, what is the speed of the boat? (12 – 5).

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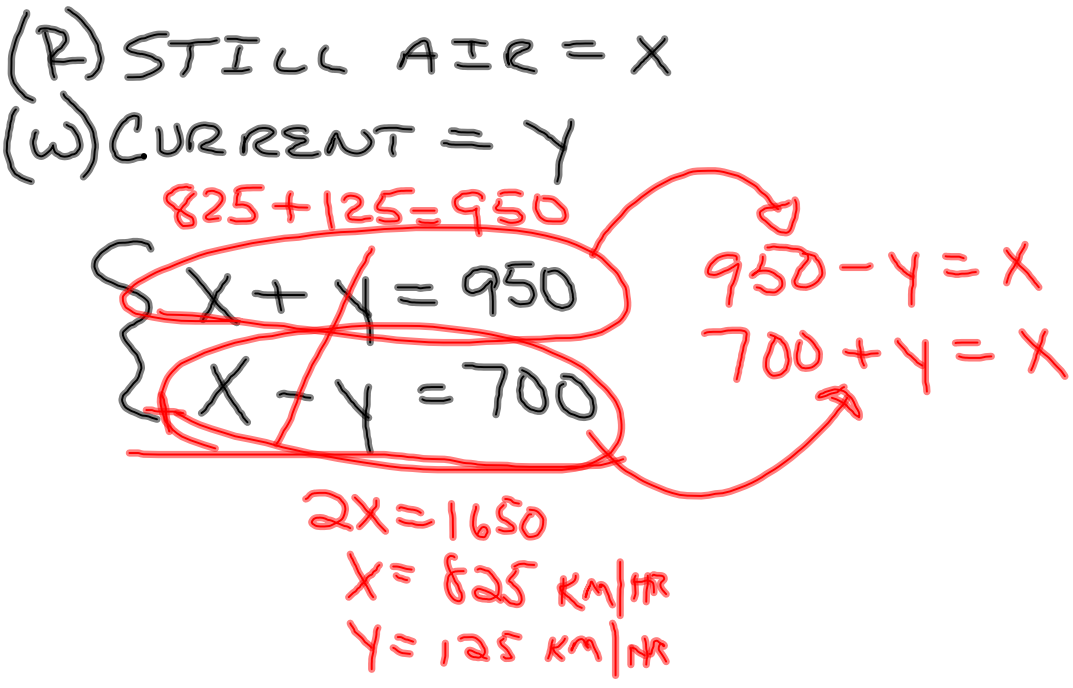
Example

A jet can travel at 950 km/h with the wind and 700 km/h against the wind. Find the rate of the plane in still air and the wind speed.



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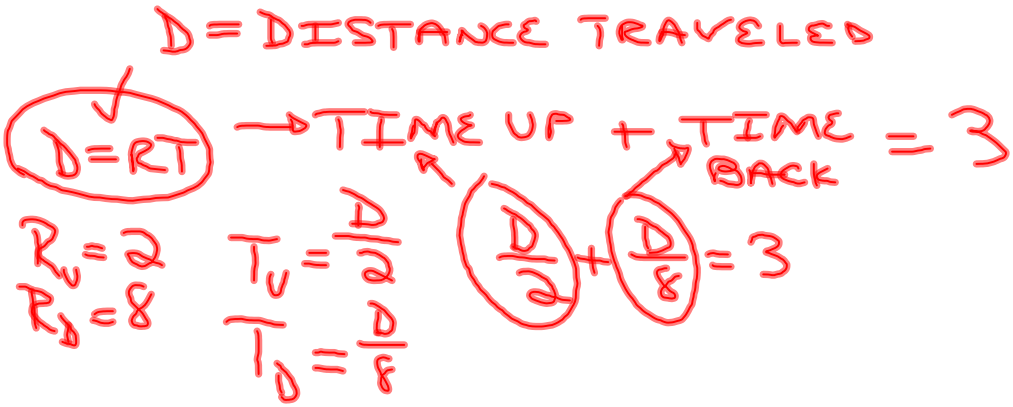
Another Example

Sam and Janet have rented a canoe. How far upstream can they paddle if their rate in still water is 5 km/h, the rate of the current is 3 km/h, and they must return to their starting point in 3 hours?

What is consistent between the two "legs" of the trip?



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Another.

A jet can travel the 6000 km distance between Washington D.C. and London in 6 hours with the wind. The return trip against the same wind takes 7.5 hours. Find the rate of the jet in still air and the rate of the wind.

	Rate	Time	Distance
With the wind	$R+W$	6	$6(R+W)$
Against the wind	$R-W$	7.5	$7.5(R-W)$

$6(R+W) = 6000$ (1000)

$7.5(R-W) = 6000$ (800)

$2R = 1800$

$R = 900$

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One more...

A power boat has a four-hour supply of gasoline. How far can this boat travel from the marina if the rate out against the current is 40 km/h and the rate back in with the current is 60 km/h?

$D = RT$

$T = \frac{D}{R}$

$T_U = \frac{D}{40}$

$T_D = \frac{D}{60}$

$TIME_U + TIME_D = 4$

$\frac{D}{40} + \frac{D}{60} = 4$

$3D + 2D = 480$

$5D = 480$

$D = 96\ km$

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