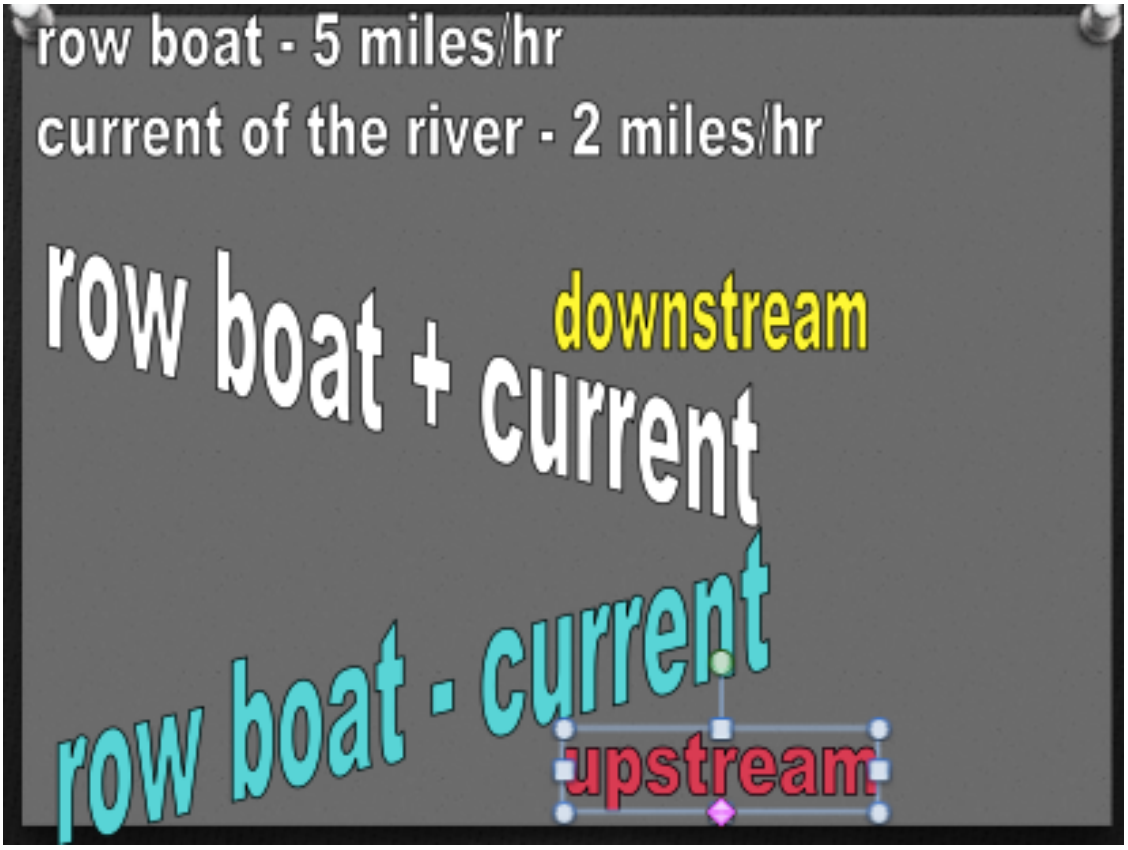



It takes 2 hours for a boat to travel 28 km downstream. The same boat can travel 18 km upstream in 3 hours. Find the rate of the boat in still water and the rate of the current.

Downstream ⟸ boat ⟹ upstream

⟸ current

**The boat travels with the current when it goes downstream.**

**Thus, the rate the boat travels downstream is the speed of the boat in still water plus the rate of the current.**

| | r | t | d |
|---|---|---|---|
| downstream | x + y | 2 | 28 |
| upstream | x - y | 3 | 18 |

$(x + y)\,2 = 28$ $\quad x + y = 14$

$(x - y)\,3 = 18$ $\quad \underline{x - y = 6}$

$2x = 20$

$x = 10$

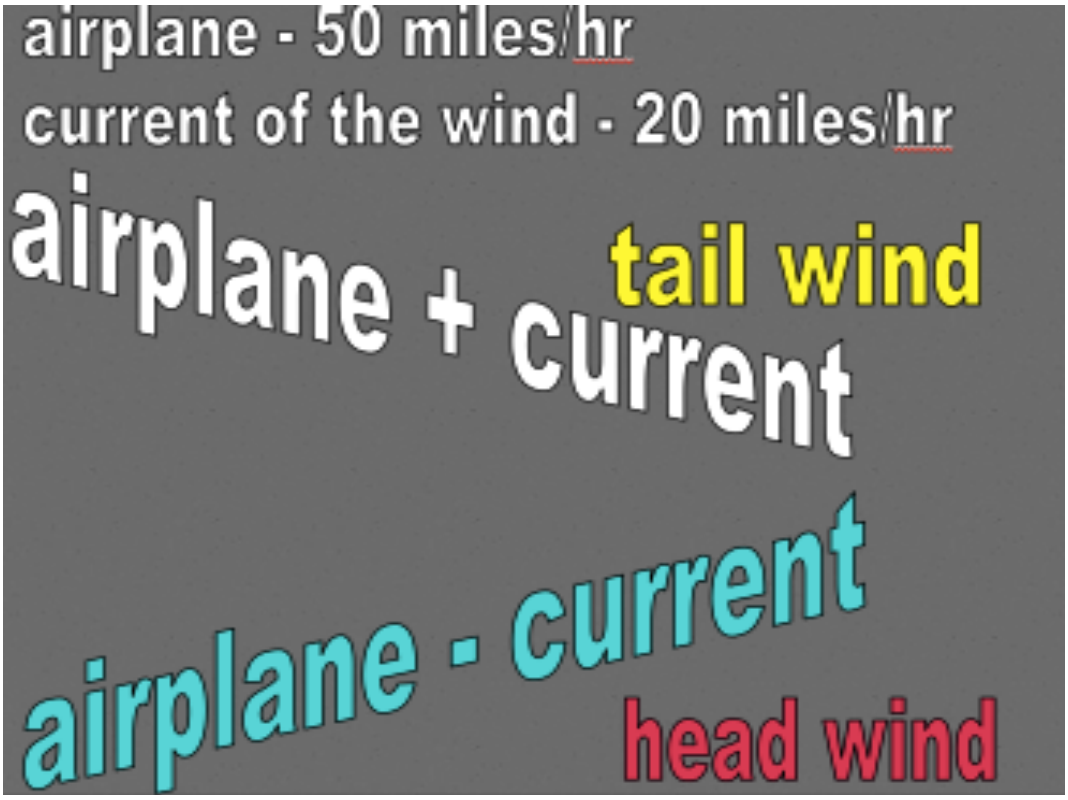
$10 + y = 14$

$y = 4$

Conclusion: The rate of the boat in still water is 10 kph. The rate of the current is 4 kph.

A crew rowing with the current traveled 16 km in 2 hours; against the current, the crew rowed 8 km in 2 hours. Find the rate of rowing in still water and the rate of the current.

| | Rate | Time | Distance |
|---|---|---|---|
| Downstream | | | |
| Upstream | | | |



Traveling with the wind, a plane flew 4000 km in 5 h. Against the wind the plane only flew 3000 km in the same time. Find the rate of speed of the plane in calm air and the speed of the wind.

| | Rate | Time | Distance |
|---|---|---|---|
| With the wind | x + y | 5 | 4000 |
| Against the wind | x - y | 5 | 3000 |

**In general,**

x - rate in still water or air

y - rate of the water or wind speed

x + y - rate going with the current (downstream / tail wind)

x - y - rate going against the current (upstream / head wind)