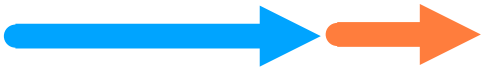
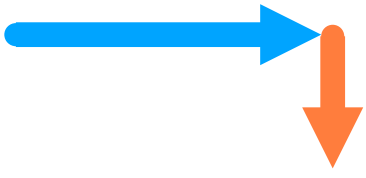
How to combine vectors

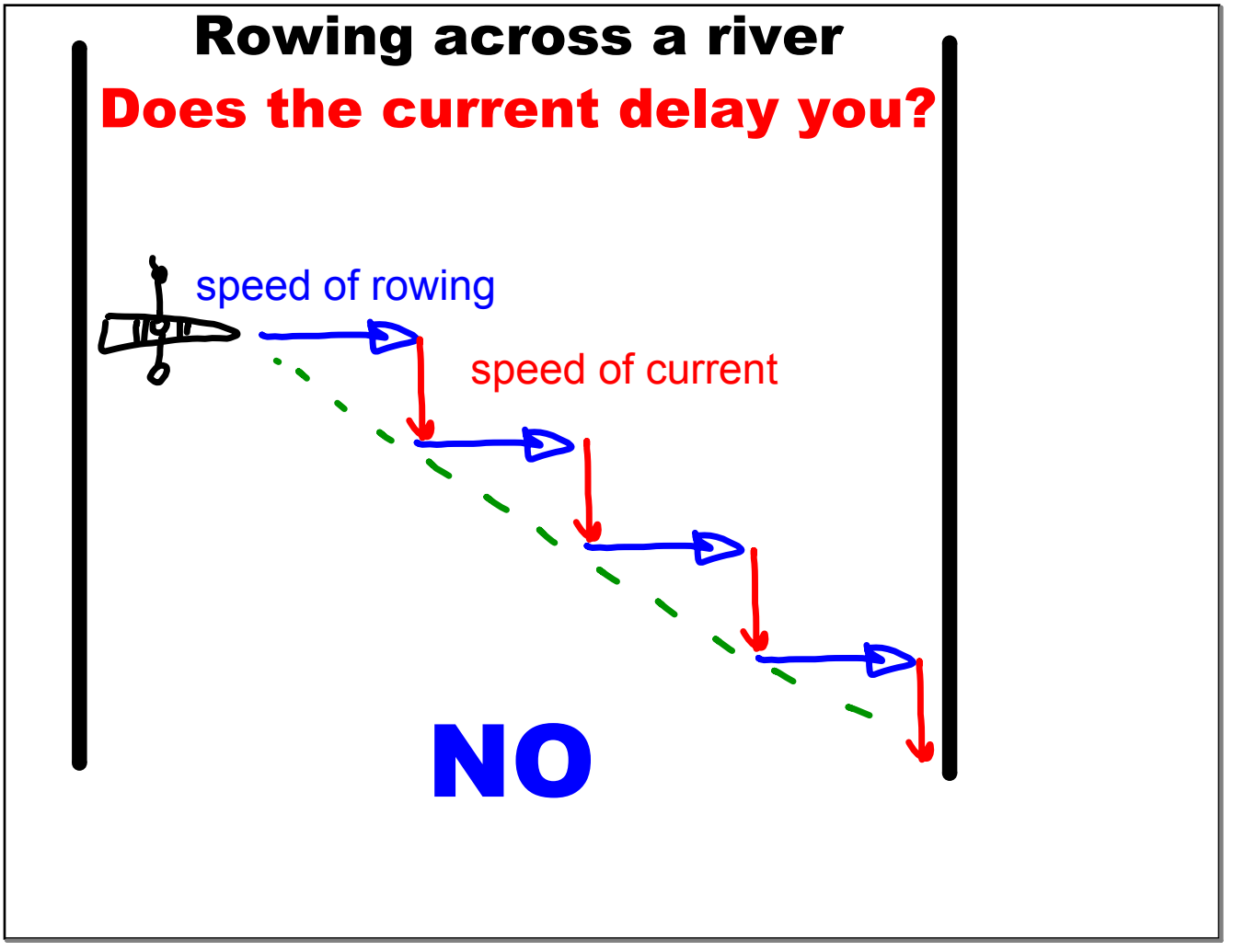
subtract



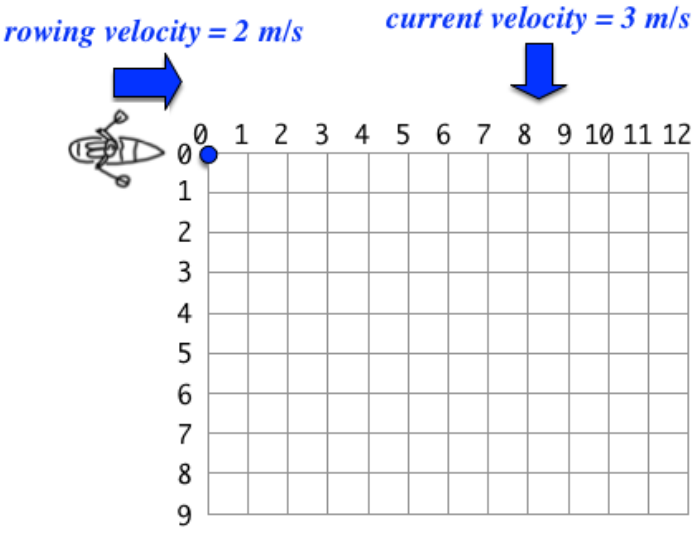
add



don't add or subtract; they both happen (hypotenuse)


Rowing across a river
Does the current delay you?
speed of rowing
speed of current
NO

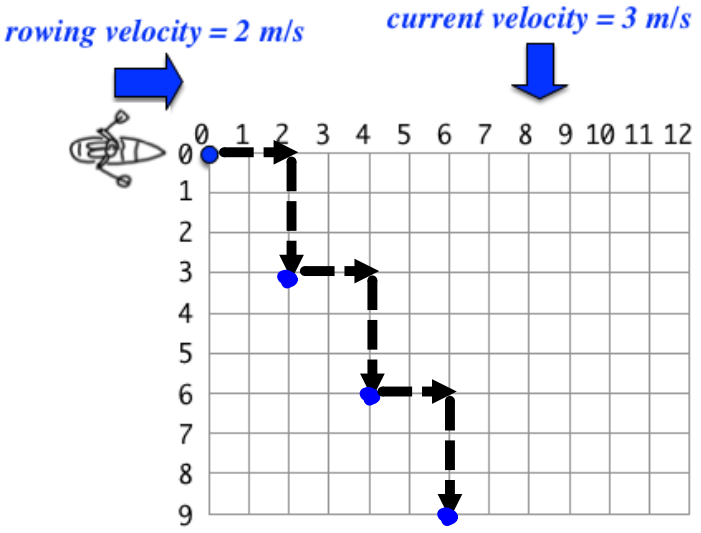
2. Vx and Vy



First solve for the time it takes the boat to cross 12 m to the right.

Then solve for how far down the current carries the boat

2. Vx and Vy



First solve for the time it takes the boat to cross 12 m to the right

Then solve for how far down the current carries the boat

$V_{xi} = 2$ m/s
$a = 0$
$\Delta x = 12$ m
$t = ?$

$\Delta x = V_{xi}t + 1/2at^2$

$12 = (2)t + 0$

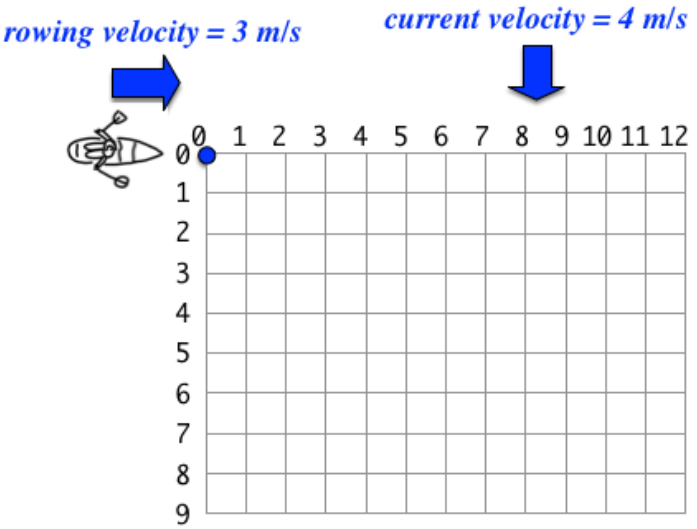
$6 \text{ s} = t$

$V_{yi} = -3$ m/s
$a = 0$
$t = 6$ s
$\Delta y = ?$

$\Delta y = V_{yi}t + 1/2at^2$

$= (-3)(6) + 0$

$= -18$ m



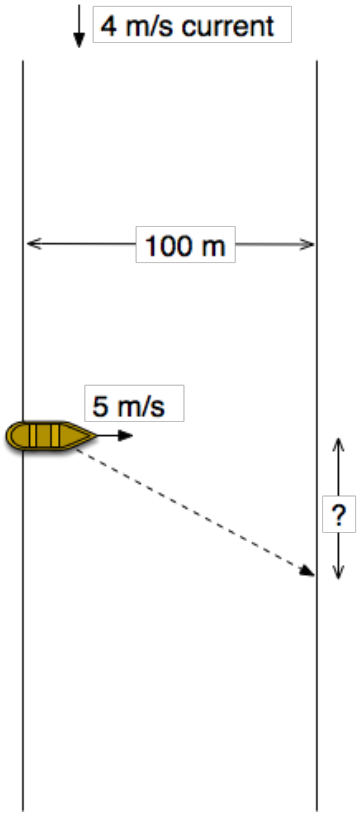
First solve for the time it takes the boat to cross 12 m to the right.

Then solve for how far down the current carries the boat

Try it!

$t = 4$ s

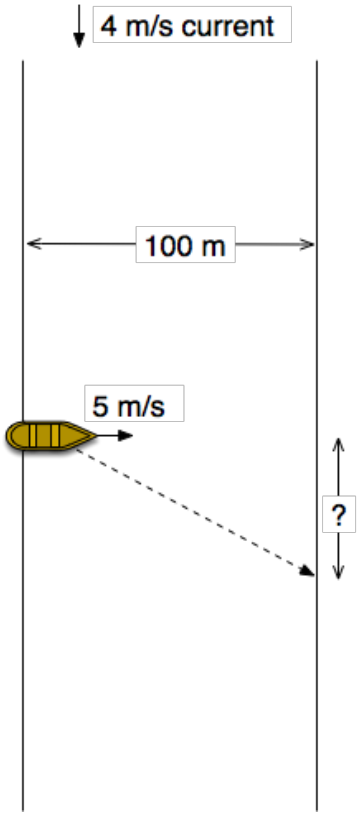
$\Delta y = -16$ m



The speed of the motorboat's engine is 5 m/s. The current flows at 4 m/s. If the motorboat is pointed straight across the river…

(a) how long will it take to cross?

(b) How far downstream will it be carried in that time?



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X

$\Delta x = 100$ m

$v_{xi} = 5$ m/s

$a_x = 0$

$t = ?$

$\Delta x = v_{xi} t + 1/2\, a_x t^2$

$100 = 5t + 0$

$20 \text{ s} = t$

Y

$\Delta y = ?$

$v_{yi} = -4$ m/s

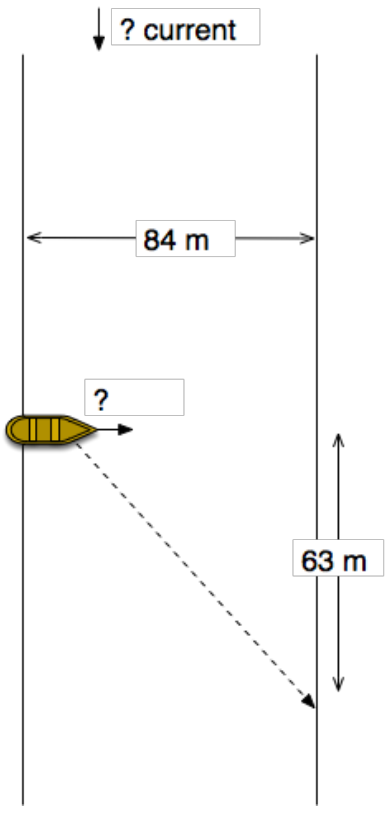
$a_y = 0$

$\Delta y = v_{yi} t + 1/2\, a_y t^2$

$\Delta y = -4t + 0$

$\Delta y = -4(20)$

$\Delta y = -80$ m



The motorboat is pointed straight across the river and takes 7 seconds to cross. During that time, the motorboat is carried 63 m downstream.

(a) What is the velocity of the current?

(b) What velocity is provided by the motorboat's engines?

Try it!

See if you can get the answers:

(a) v_y = 9 m/s

(b) v_x = 12 m/s