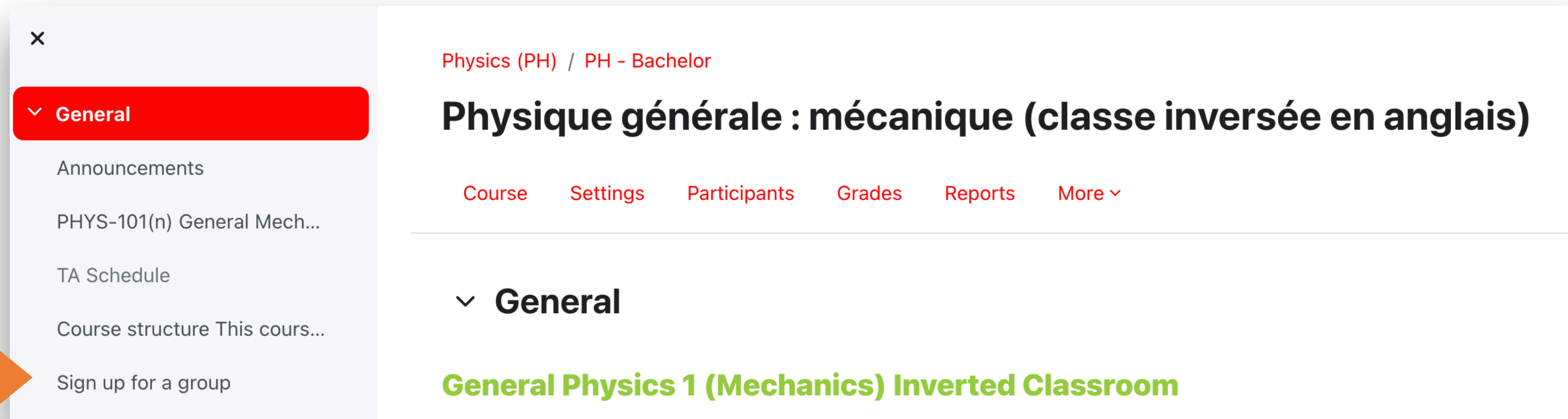


# PHYS-101 WEEK 2

An aerial photograph of a winding asphalt road through a green, wooded area. The road curves from the top left towards the bottom right. Several cars are visible: a dark car on the curve, a red car on the straight section, and another dark car further down. A building with a brown roof is visible on the right side of the road. The surrounding landscape is lush with green trees and grass.

# GROUPS

- If you want to participate in group exercises, sign up for a group!



Physics (PH) / PH - Bachelor

## Physique générale : mécanique (classe inversée en anglais)

Course Settings Participants Grades Reports More ▾

▾ General

**General Physics 1 (Mechanics) Inverted Classroom**

Announcements

PHYS-101(n) General Mech...

TA Schedule

Course structure This cours...

Sign up for a group



- If you have a group, submit your group charter! **DUE THURSDAY!!**

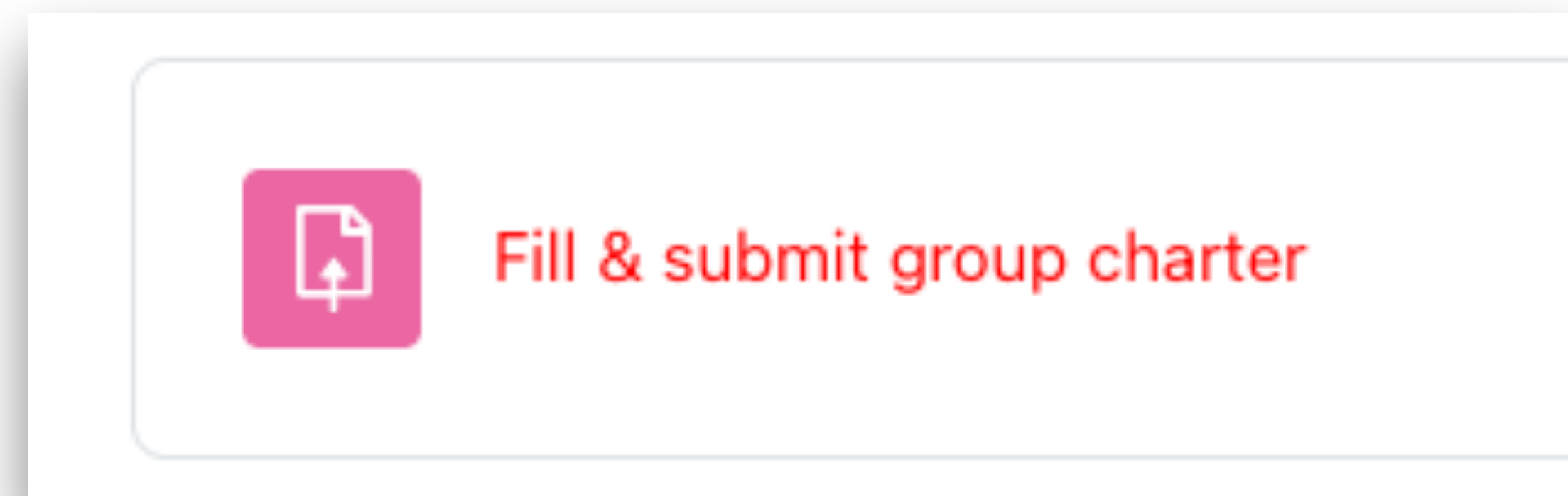


▾ Week 1, Sept 8-14

Course MaterialUnits & Dim...

SolutionsWeek 1 problem s...

**Fill & submit group charter**



**Fill & submit group charter**

# EVENING EXERCISE SESSIONS


- Starting **September 29** (Week 4) and ending the week of **8 December** (Week 13) you have the option of attending **additional evening exercise sessions with TAs**
- Tuesday 17h30-19h in CE 1 101
- Thursday 18h15-19h15 in MA A1 10

# KINEMATICS



# DRIVING

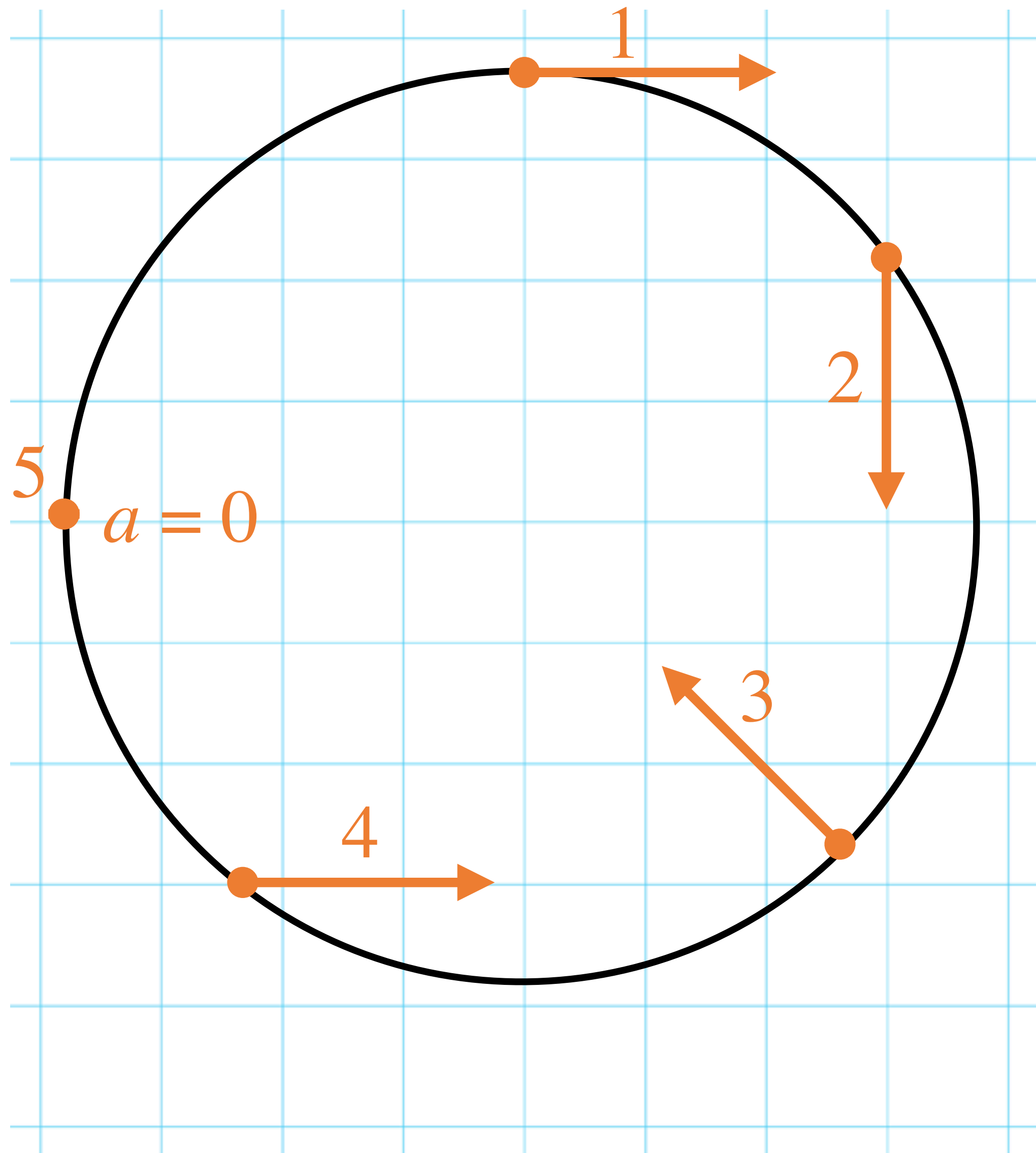


 Which element(s) of a car change the acceleration of the vehicle?

- The brake pedal 0%
- The gas pedal 0%
- The steering wheel 0%



# CIRCULAR MOVEMENT

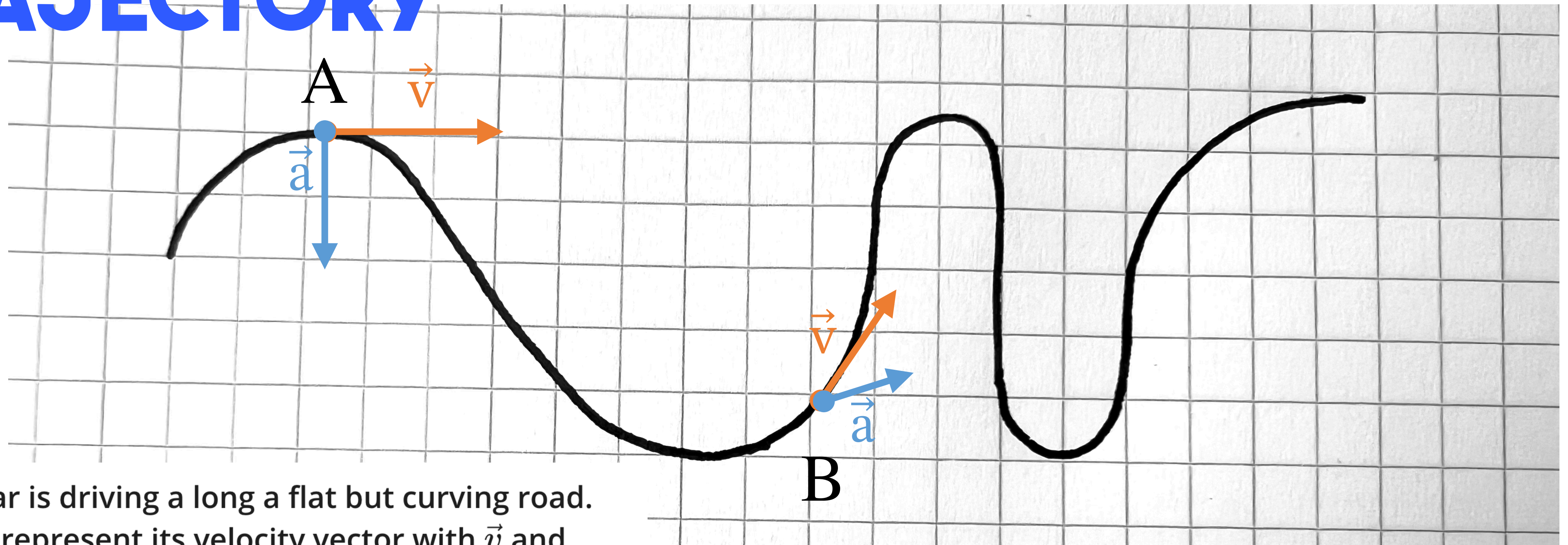



- A car is traveling on a horizontal circular track. Its acceleration vector (top view) is represented at five points along the path.

 At which point is the car's speed greatest?

- 1 0%
- 2 0%
- 3 0%
- 4 0%
- 5 0%

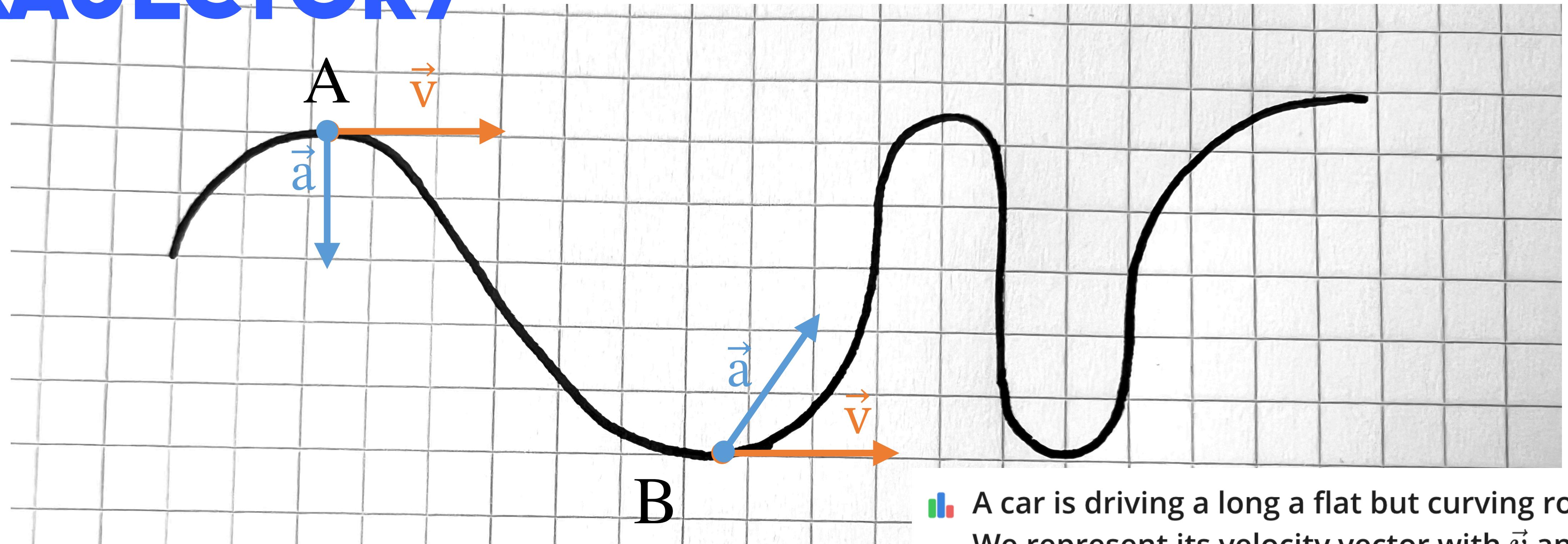
# TRAJECTORY




 A car is driving along a flat but curving road. We represent its velocity vector with  $\vec{v}$  and acceleration vector with  $\vec{a}$ . Assuming that the representation of  $\vec{v}$  and  $\vec{a}$  at point A is correct, are  $\vec{v}$  and  $\vec{a}$  correct at point B?

- True 0%
- False 0%

# TRAJECTORY

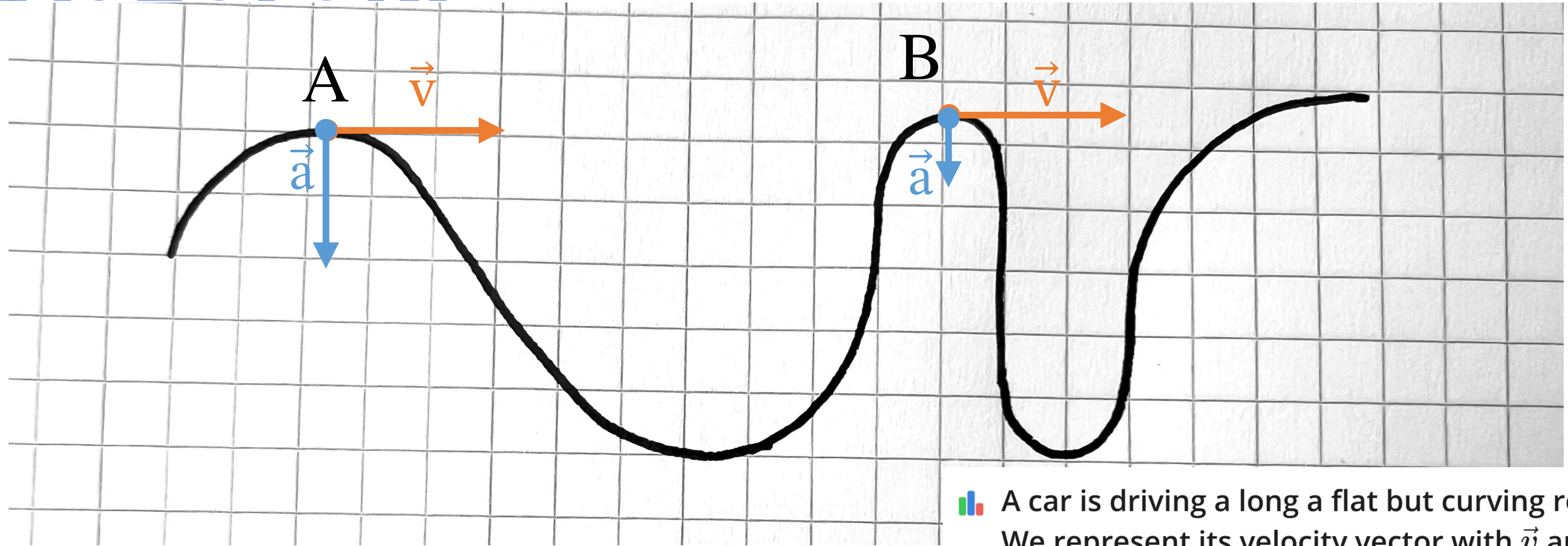



 A car is driving along a flat but curving road. We represent its velocity vector with  $\vec{v}$  and acceleration vector with  $\vec{a}$ . Assuming that the representation of  $\vec{v}$  and  $\vec{a}$  at point A is correct, are  $\vec{v}$  and  $\vec{a}$  correct at point B?

True 0%

False 0%

# TRAJECTORY



 A car is driving along a flat but curving road. We represent its velocity vector with  $\vec{v}$  and acceleration vector with  $\vec{a}$ . Assuming that the representation of  $\vec{v}$  and  $\vec{a}$  at point A is correct, are  $\vec{v}$  and  $\vec{a}$  correct at point B?

- True 0%
- False 0%

# TRUE/FALSE



Which of these statements are true? We consider that the object acts like a material point.



An object's direction of acceleration can vary when the direction of its velocity remains constant.

0%

An object's direction of velocity can vary when its acceleration is constant.

0%

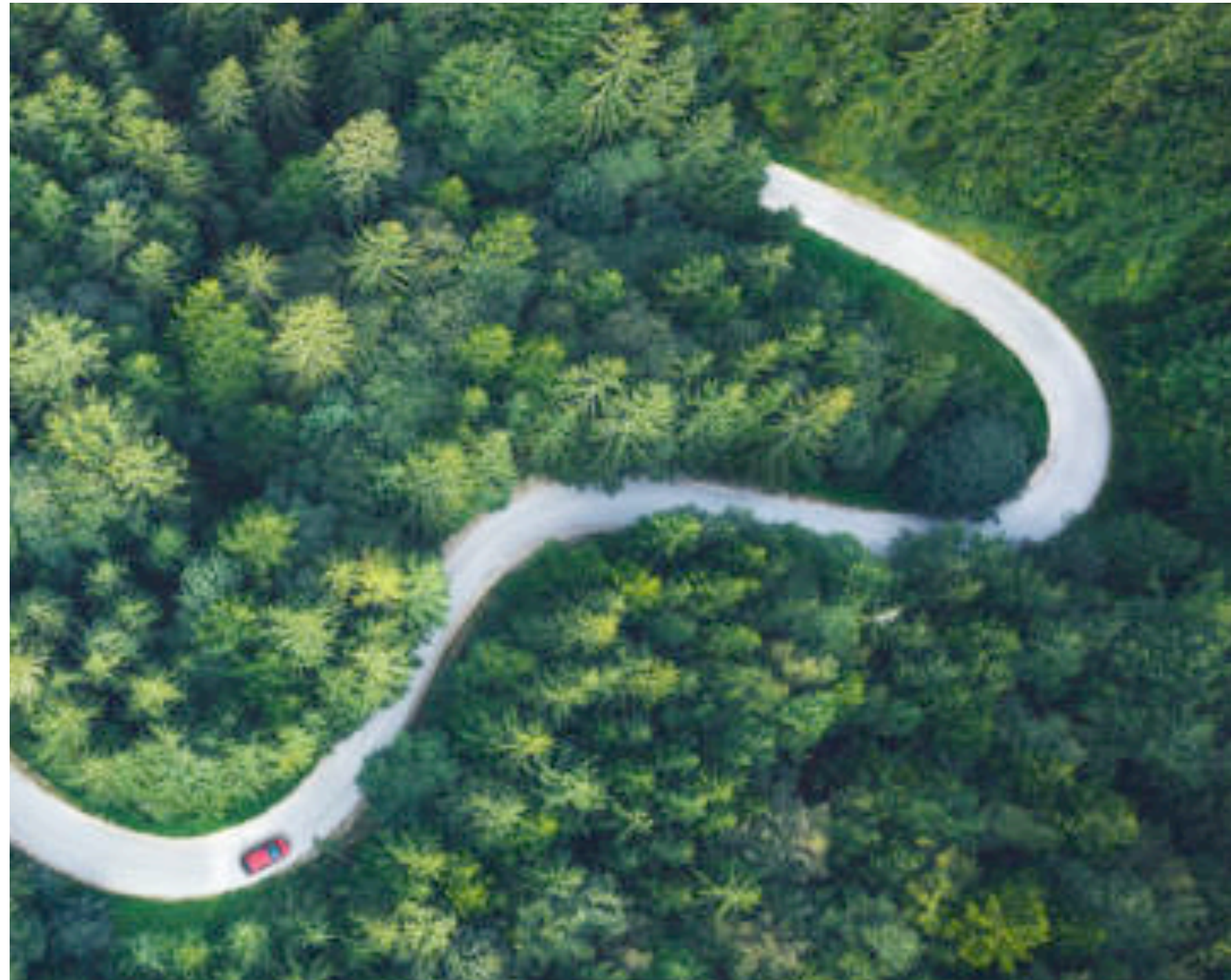
An object can have curvilinear motion in a plane even if the direction of its acceleration is fixed.

0%

An object can have curvilinear motion not contained in a plane if the direction of its acceleration is fixed.

0%

# ROAD TRIP



Matt is driving his car on a small country road with automatic cruise control so that he stays at exactly 50 km/h on his journey as it winds through the countryside.

We call  $\vec{v}$  velocity,  $v = |\vec{v}|$  speed,  $\vec{a}$  acceleration, and  $a = |\vec{a}|$  magnitude of acceleration

 Which statements are correct? ...

- $\vec{v}$  is constant 0%
- $v$  is constant 0%
- $\vec{a}$  is constant 0%
- $a$  is constant 0%
- $a = 0$  0%
- The velocity is constant 0%

# SWIMMING

**Exercise 4** *Agent Logan has a train to catch*

In pursuit of a criminal, FBI agent Logan must cross a river 1600 m wide flowing at  $0.80 \text{ m}\cdot\text{s}^{-1}$  in the shortest possible time and get directly opposite his starting point. Knowing that he can row at  $1.50 \text{ m}\cdot\text{s}^{-1}$  and run at  $3.00 \text{ m}\cdot\text{s}^{-1}$ , describe the route he should take (by boat and on foot along the bank) to cross this river as quickly as possible. Determine the minimum time required for this crossing.

Reminder : if a boat moves at speed  $\vec{v}$  relative to the water in a river, and the river flows at  $\vec{v}_c$  relative to the bank, then the boat moves at  $\vec{v} + \vec{v}_c$  relative to the bank.

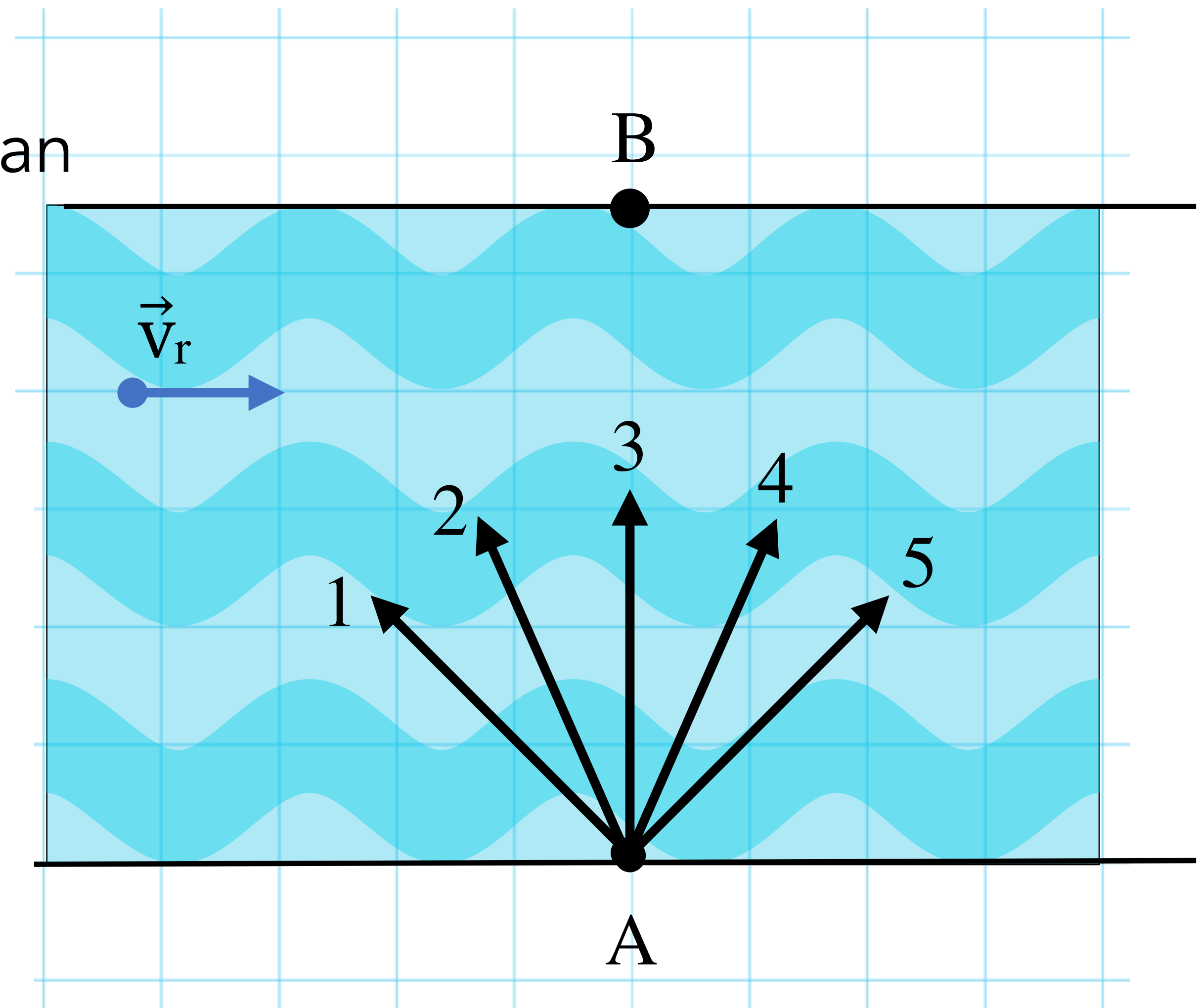
*Note : This exercise is difficult. You have the mathematical tools to solve it, but it requires understanding the problem as a whole, breaking it down properly, and making the projections correctly !*

# SWIMMING

- Logan needs to swim across a river with current  $\vec{v}_r$ . He swims with a constant speed  $v$  and starts from point A, but can choose his heading from the 5 shown.
- Which heading should he choose to minimize the crossing time?

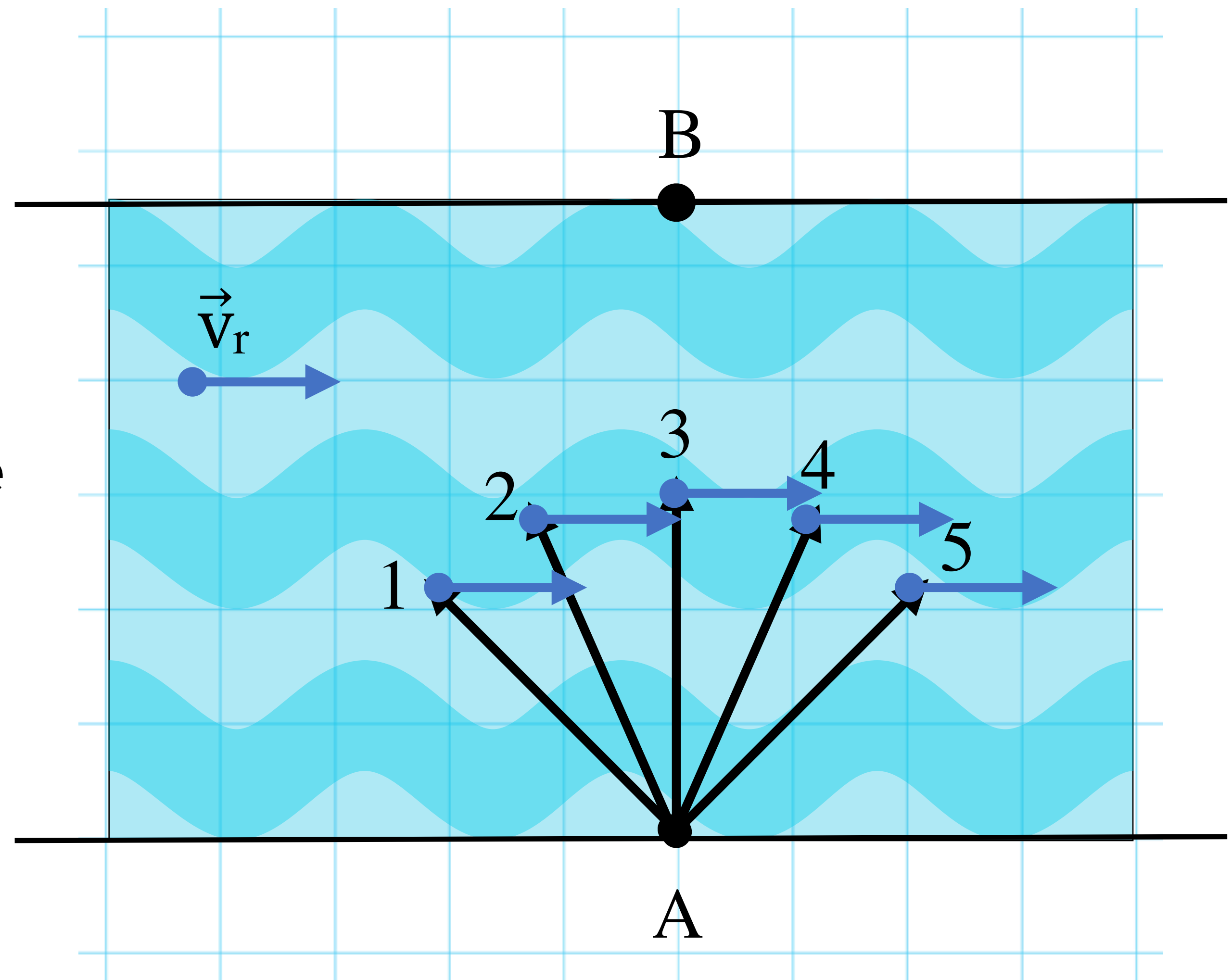


1	0%
2	0%
3	0%
4	0%
5	0%



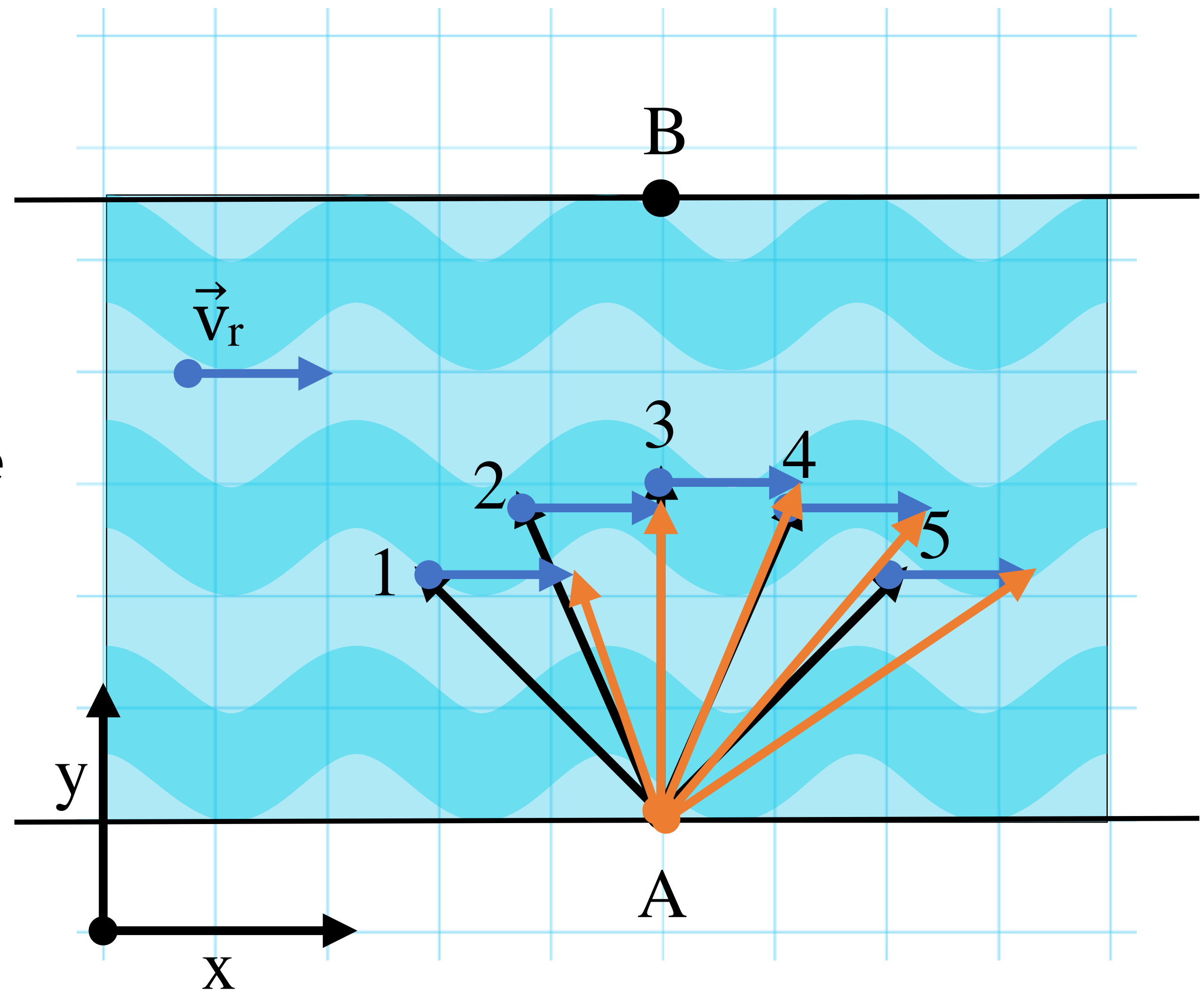
# SWIMMING

- Logan needs to swim across a river with current  $\vec{v}_r$ . He swims with a constant speed  $v$  and starts from point A, but can choose his heading from the 5 shown.
- Which heading should he choose to minimize the crossing time?



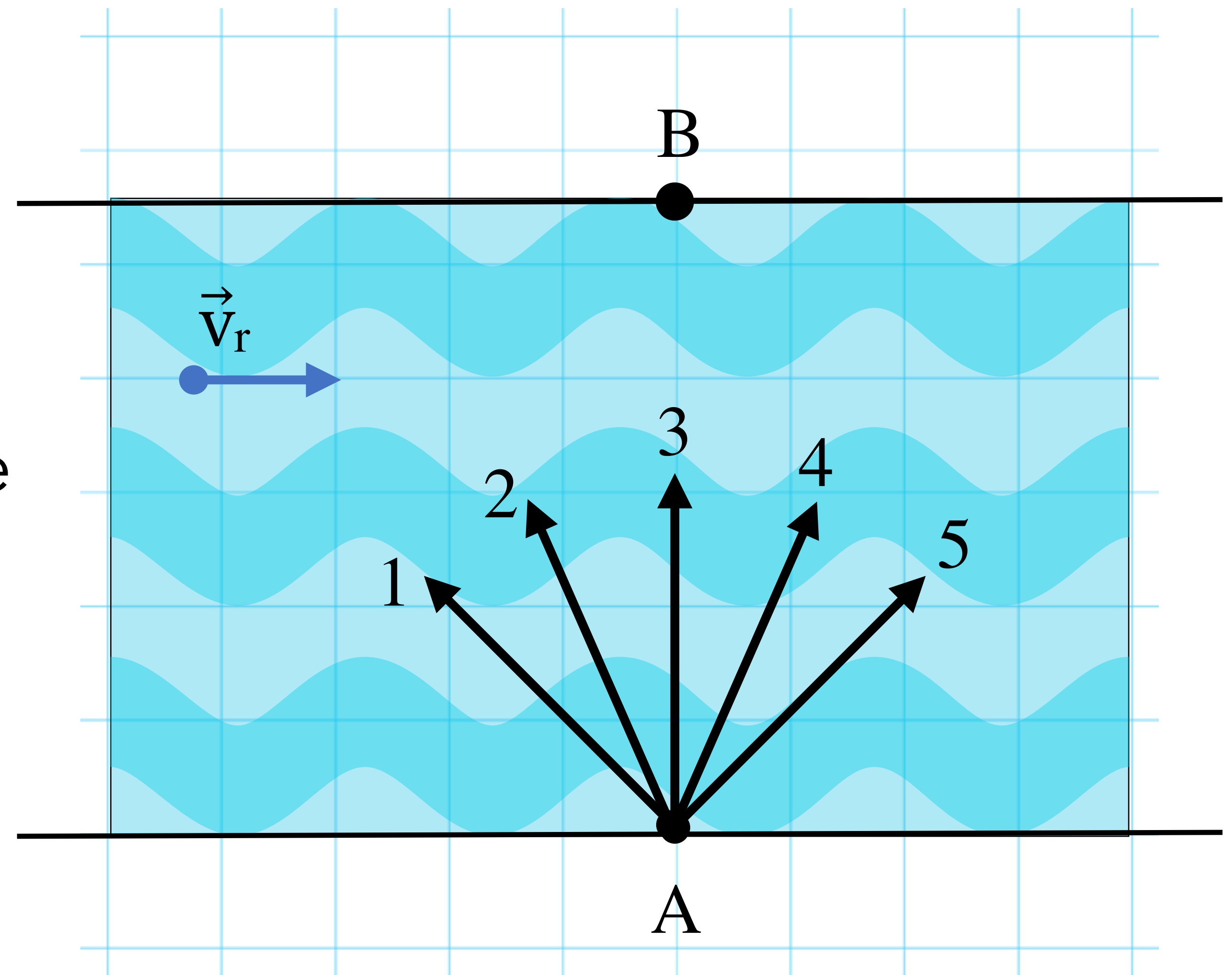
# SWIMMING

- Logan needs to swim across a river with current  $\vec{v}_r$ . He swims with a constant speed  $v$  and starts from point A, but can choose his heading from the 5 shown.
- Which heading should he choose to minimize the crossing time?



# SWIMMING

- Logan needs to swim across a river with current  $\vec{v}_r$ . He swims with a constant speed  $v$  and starts from point A, but can choose his heading from the 5 shown.
- Which one should he choose to arrive at just at point B?



# EXERCISE: GO-KARTING

Louise is going karting for the first time. Her kart has a maximum speed  $V_{\max}$  of 10 m/s. She is driving in a straight line. Carefully, she gradually presses the accelerator, so that her acceleration increases linearly with time:  $a = bt$  with  $b$  a constant.

From a standstill, it takes Louise's kart 30 m to reach  $V_{\max}$ , then it drives at a constant speed.

- 1– How long does the acceleration phase last?
- 2– What is the value of  $b$ ?
- 3– What is the maximum value of the acceleration?