

## Ex 12 Momentum in two traffic accidents

In the Victorian Alps a minibus (**B**) travelling north crashes into the back of a parked car (**C**), as shown in Fig. 1.

(You can assume that the frictional forces between the tyres and the icy road are negligible and that the road is horizontal.)

Fig. 2 shows vectors representing the momentum  $p_b$  of the bus and  $p_c$  of the car just prior to the collision.

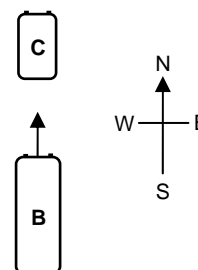


Fig. 1

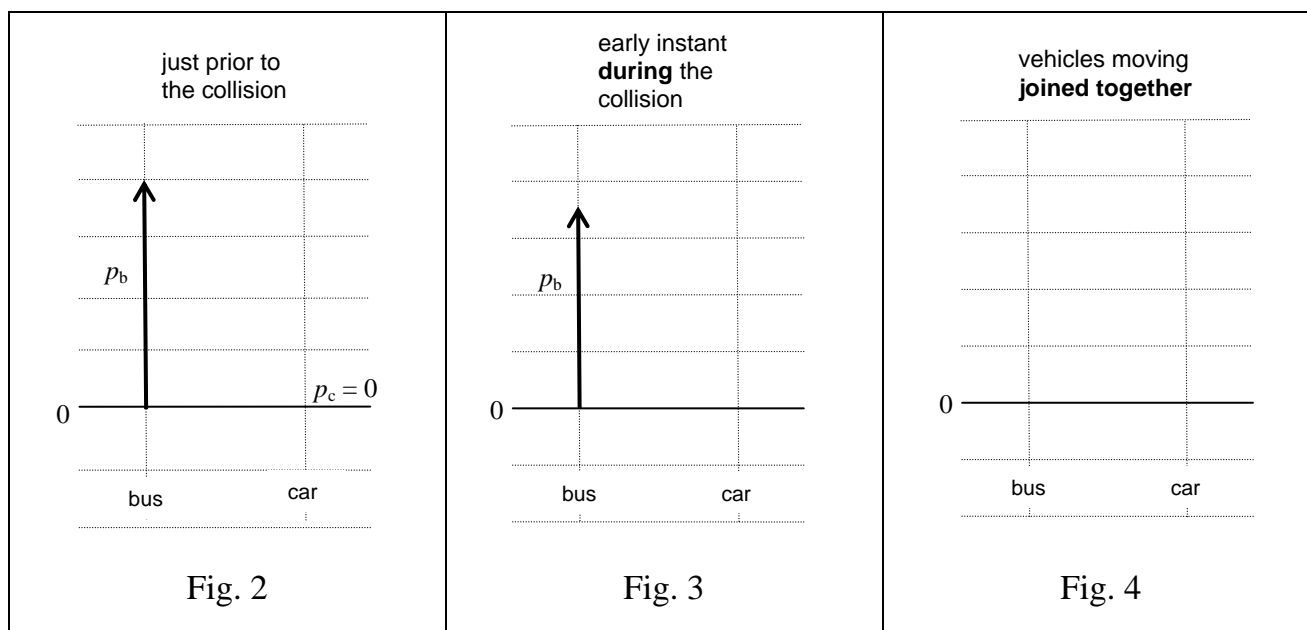
Fig. 3 shows the momentum  $p_b$  of the bus at an early instant **during** the collision.

- 1 On Fig. 3 draw in a vector to represent the momentum  $p_c$  of the car at this instant during the collision.

As a result of the collision the bus and car move forward **joined together**.

The mass of the bus is three times the mass of the car.

- 2 On Fig. 4 draw in vectors to represent the momenta  $p_b$  of the bus and  $p_c$  of the car as they move forward joined together.



## Ex 12 Momentum in two traffic accidents (contd)

Consider a **different** collision on the same icy road where the car runs into the back of the stationary bus as in Fig. 5

In this collision they do **not** stay joined together after the collision.

Fig. 6 shows the momentum  $p_b$  of the bus and  $p_c$  of the car just prior to the collision.

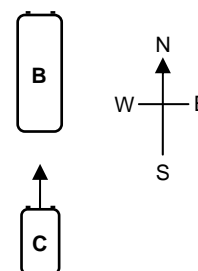


Fig. 5

Fig. 7 shows the momentum  $p_b$  of the bus just after the two vehicles separate.

- 3 On Fig. 7 draw in a vector to represent the momentum  $p_c$  of the car just after the vehicles separate.

