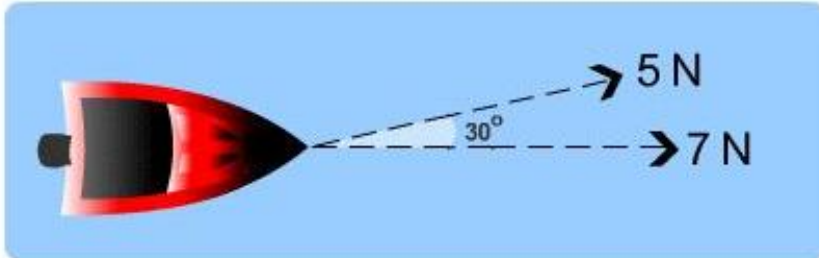


RESOLVING FORCES - PRACTICE QUESTIONS

Remember to state the direction of the force.

1. Using a scale diagram AND trigonometry:

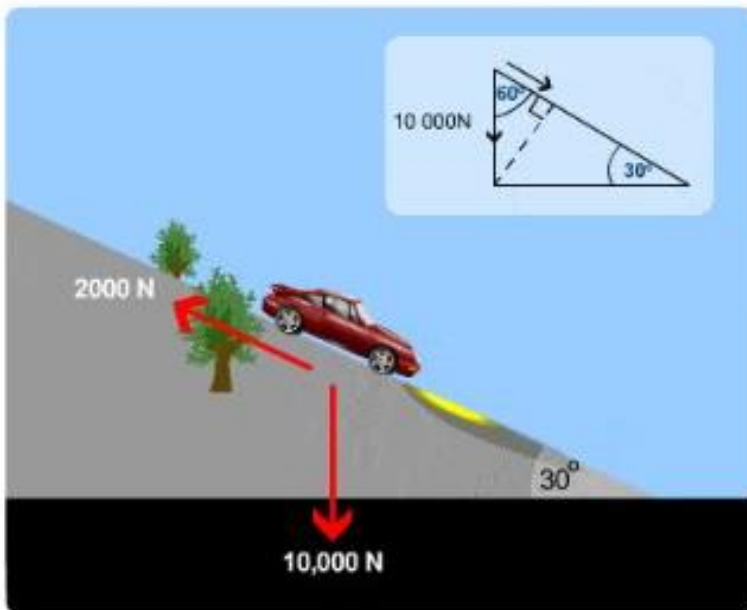
Find the forward force on the boat.



2. Using a scale diagram AND trigonometry:

Sometimes the direction we are interested in is not vertical or horizontal, long as we still only add parallel forces.

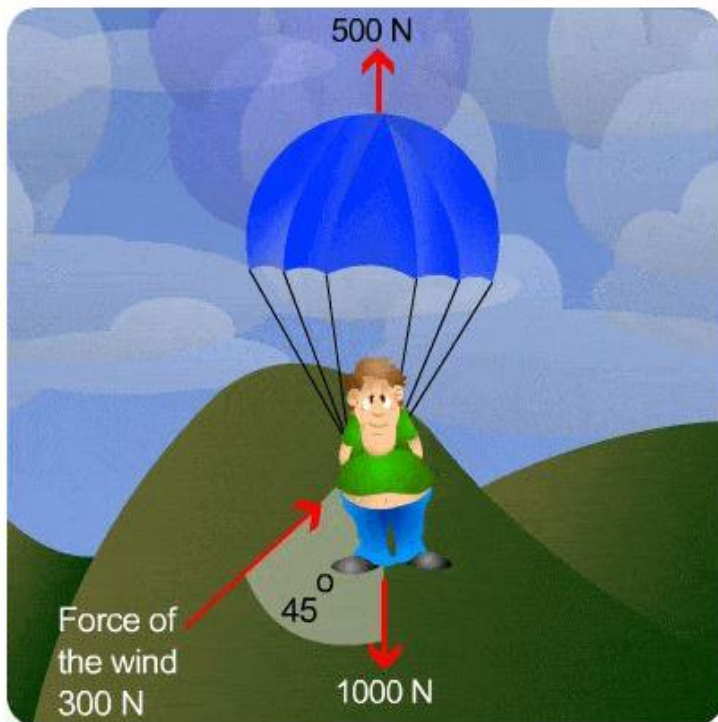
Find the force on the car parallel to the slope:



3. Using a scale diagram AND trigonometry:

(a) Find the horizontal force on the parachutist

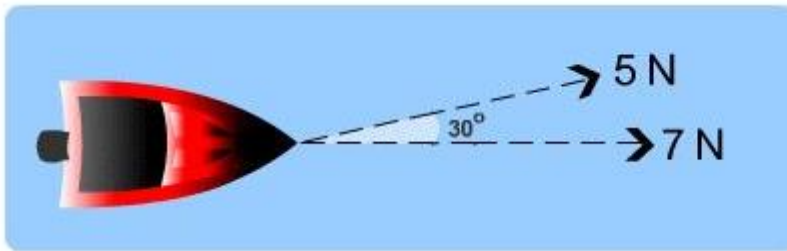
(b) Find the overall vertical force on the parachutist



Answers

1.

Find the forward force on the boat.



First you need to find the amount of the 5 N force that acts in the forward direction, using trigonometry:

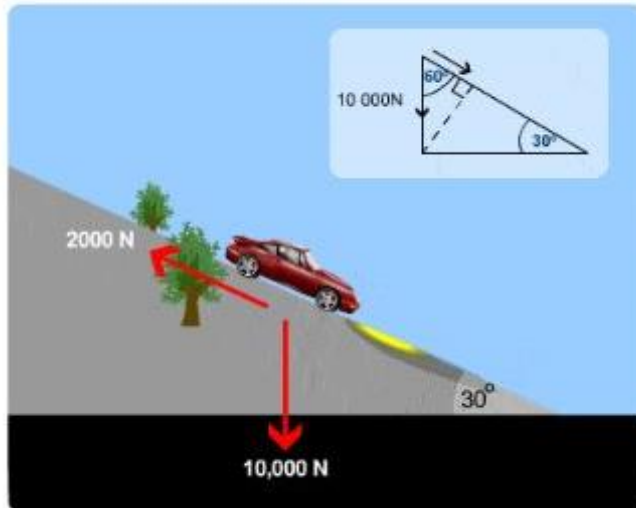
Part of 5 N force in forward direction = $5 \cos 30^\circ = 4.3 \text{ N}$

Then this can be added to the 7 N force:

$4.3 + 7 = 11.3 \text{ N}$ force in the forward direction.

2.

Find the force on the car parallel to the slope:



The 2000 N force is already parallel to the slope so we can ignore it for a moment.

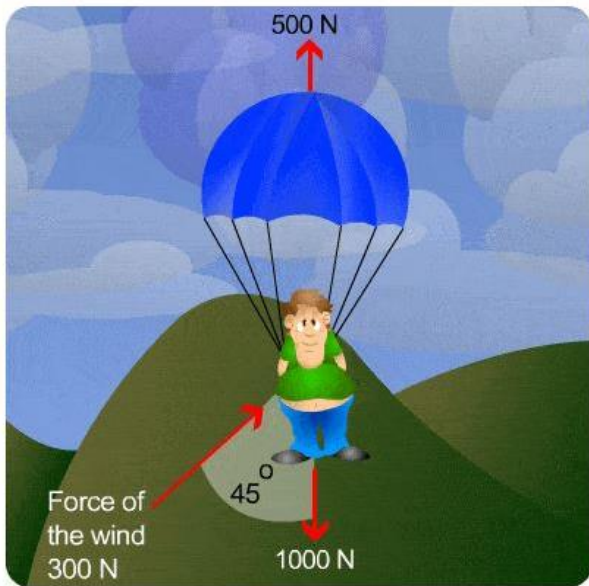
The 10 000 N is at an angle of 60 degrees to the slope so we need to use trigonometry to find its component parallel to the slope (look at the small triangle carefully):

Component parallel to the slope = $10\,000 \cos 60^\circ = 5\,000 \text{ N}$ down the slope.

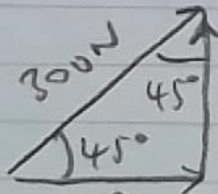
Now we can simply subtract the 2 000 N from the 5 000 N force as they are in opposite directions.

So the resultant force parallel to the slope = $5\,000 - 2\,000 = 3\,000 \text{ N}$ down the slope.

3.



3.



$$\leftarrow 300 \sin 45^\circ \text{ (or } 300 \cos 45^\circ) = 210 \text{ N}$$

$$\uparrow 300 \sin 45^\circ \text{ (or } 300 \cos 45^\circ) = 210 \text{ N}$$

(a) HORIZONTAL FORCE = 210 N TO THE RIGHT

(b) VERTICAL FORCE = $1000 - 500 - 210 = 290 \text{ N}$
DOWNWARDS