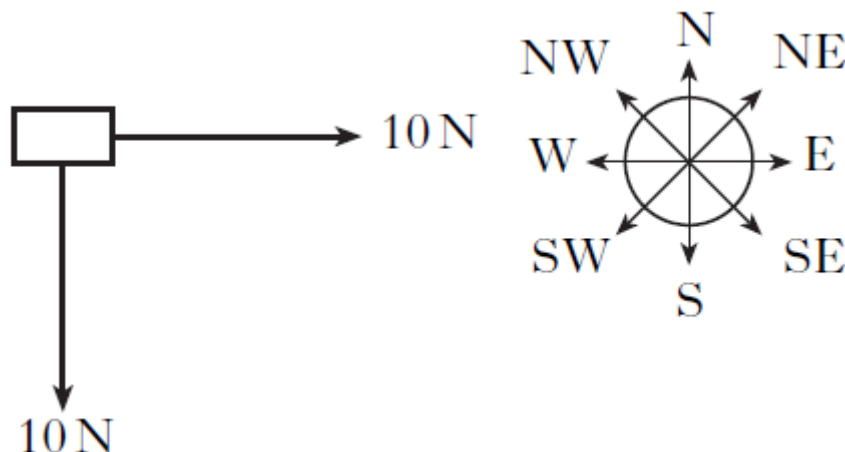


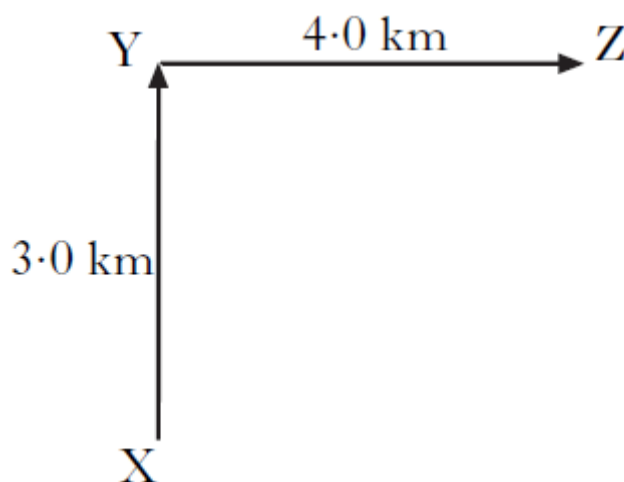
Vectors and Scalars Questions – NAT 5

- 1) Two forces act on an object, with the angle between the forces being 90° .



Calculate the resultant force acting on the object. (M + D's!!!!!!)

- 2) A student walks from **X to Y** and then from **Y to Z** in 2 hours.



Calculate or find the following from the students walk:

- Total distance travelled in km
- Average speed in kmh^{-1}
- Displacement (M + D's!!!!!!) in km
- Average velocity (M + D's!!!!!!) in kmh^{-1}

3) A cross country runner travels 2.1km due South followed by 1.5km due West in a total time of 20 minutes.

Calculate or find the following from the cross country run:

- a) Total distance travelled in m
- b) Average speed in ms^{-1}
- c) Displacement in m
- d) Average velocity in ms^{-1}

4) Put the following quantities into the table below:

Velocity, distance, time, weight, speed, mass, displacement, force, power and acceleration.

Scalars	Vectors

5) During training an athlete sprints 30m due East followed by 50m due West.

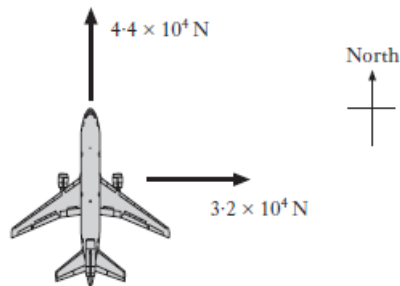
Calculate or find the following from the sprints:

- a) Distance travelled
- b) Displacement

6) An aircraft is flying horizontally at a constant speed.

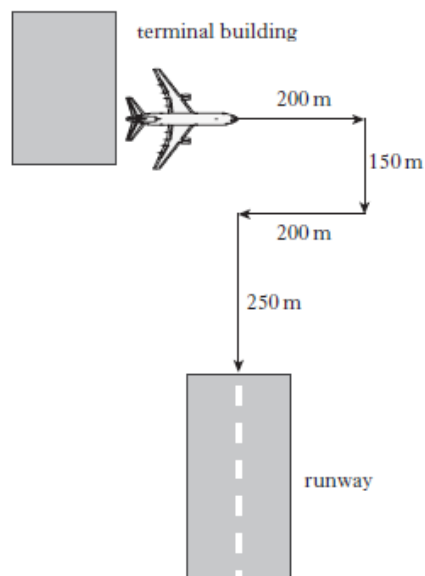


During the flight the aircraft's engines produce a force of $4.4 \times 10^4 \text{ N}$ due North. The aircraft encounters a crosswind blowing from West to East, which exerts a force of $3.2 \times 10^4 \text{ N}$.



Calculate the resultant force on the aircraft.

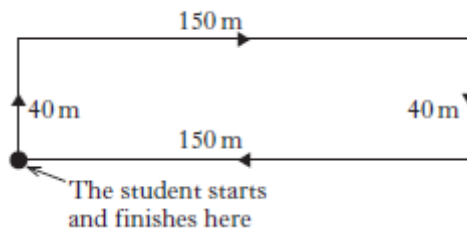
7) At an airport an aircraft moves from the terminal building to the end of the runway.



Calculate or find:

- Total distance travelled by the aircraft
- Displacement of the aircraft.

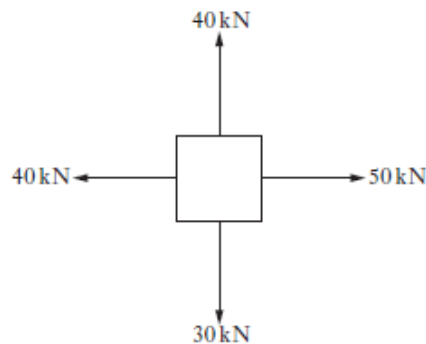
- 8) A student follows the route shown in the diagram and arrives back at the starting point.



Calculate or find:

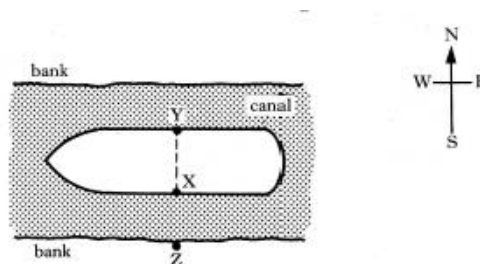
- The total distance travelled
- Displacement.

- 9) Four tug boats apply forces to an oil rig in the directions shown below.



Calculate the magnitude and direction of the resultant force acting on the oil rig.

- 10) A barge is travelling, with a velocity of 2.0ms^{-1} due West, along a canal. A girl runs, with a speed of 4.8ms^{-1} , from X to Y across the deck of the barge as shown below.



By drawing a scale drawing or otherwise, find the **resultant velocity** of the girl **relative to** someone at **point Z** on the bank of the canal.