

## 1 Sailing distance

(a) You sail 3 nautical miles  $10^\circ$  north of west and 7 nautical miles due north.

- Construct vectors that model the legs of your journey.
- How far are you from where you started?

(b) Time to head back

- Construct a vector that represents your return trip.
- Add the three vectors you have constructed.
- Explain why the sum is reasonable in terms a sailor can understand.

## 2 Vectors

Find a single vector with *all* of the following properties:

- (a) Magnitude 10
- (b) Angle of  $45^\circ$  with positive  $x$ -axis
- (c) Angle of  $60^\circ$  with positive  $y$ -axis
- (d) Positive  $z$ -component

## 3 The Cube

Find the angle between the diagonal of a cube (connecting opposite corners) and the diagonal of one of its faces (connecting opposite corners of one square face).