



Name: \_\_\_\_\_ ( ) Class: \_\_\_\_\_ Date: \_\_\_\_\_

### MA304.4.1 – Bearings

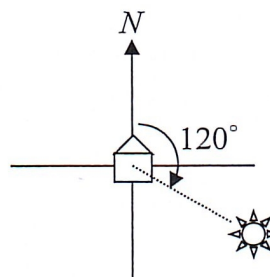
At the end of this unit, you should be able to

- understand and find bearings of a point from another
- solve problems involving bearings

Long in the past, sailors and explorers had begun using compasses to navigate through seas and lands. While the compass contains a needle which points to the magnetic north pole, locations are often determined by the angle which the line of sight is with respect to the north. It is typically written in 3-digit form, ranging from  $000^\circ$  to  $360^\circ$ . This angle is known as the **bearing**.

An object which is due east is said to have a bearing of  $090^\circ$ . Similarly, an object which is due south is said to have a bearing of  $180^\circ$  and one which is due west has a bearing of  $270^\circ$ .

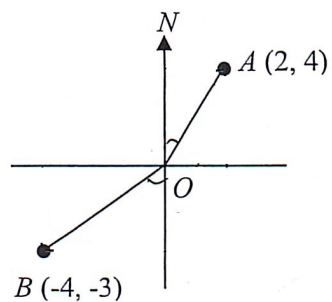
E1. The object  is at a bearing of  $120^\circ$  from .



As you can see, bearings are measured in a clockwise direction from the North line, and hence the method of measurement is different from how angles are measured in trigonometry, which you had learnt earlier.

E2. Find the bearings of the following.

(a)  $A$  from  $O$



(b)  $B$  from  $O$

(c)  $B$  from  $A$

(d)  $O$  from  $A$

(e)  $A$  from  $B$

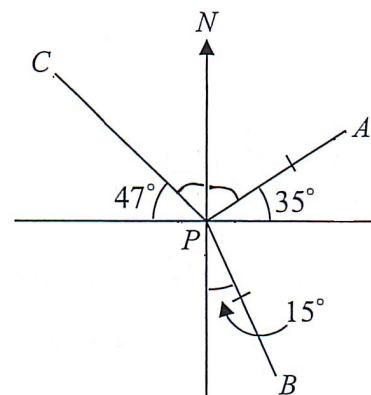
What do you notice about the answers of (a) and (d)? What about (c) and (e)?

**Given two points  $A$  and  $B$ ,**

$$\text{bearing of } B \text{ from } A = \text{bearing of } A \text{ from } B + 180^\circ \pmod{360^\circ}$$

P1. The figure shows the positions of  $P$ ,  $A$ ,  $B$  and  $C$ . Determine the bearing of

- |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|
| (a) $A$ from $P$ | (b) $B$ from $P$ | (c) $C$ from $P$ | (d) $P$ from $A$ |
| (e) $P$ from $B$ | (f) $P$ from $C$ | (g) $A$ from $B$ | (h) $B$ from $A$ |



P2. Three points  $R$ ,  $S$  and  $T$  are on level ground such that  $S$  is due east of  $R$ . The bearing of  $R$  from  $T$  is  $060^\circ$  and the bearing of  $S$  from  $T$  is  $074^\circ$ . If the distance between  $S$  and  $T$  is 14 cm, calculate the distance of  $S$  from  $R$ . Find also the area of the triangle formed by the three points.

P3.  $X$ ,  $Y$  and  $Z$  are three points on level ground. Given that the bearing of  $Y$  from  $X$  is  $123^\circ$ ,  $\angle ZXY = 31^\circ$  and  $\angle XYZ = 79^\circ$ , calculate the possible bearings of  $Z$  from  $Y$ .