Further Applications of Right Triangles

Bearing Other applications of right triangles involve **bearing,** an important concept in navigation. There are two methods for expressing bearing. When a single angle is given, such as 164°, it is understood that the bearing is measured in a clockwise direction from due north. Several sample bearings using this first method are shown in Figure 25.

Method 1:
Positive clockwise angle from 0° to 360°

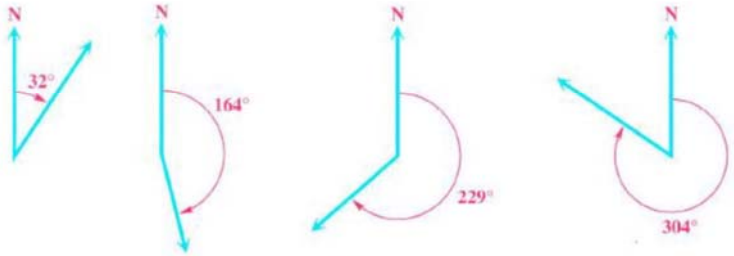
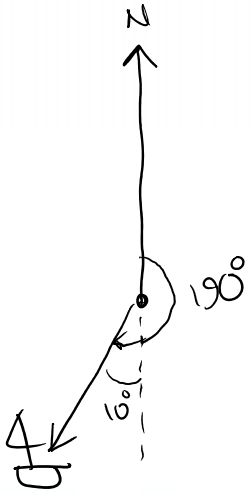


Figure 25

Example 1: A ship is sailing on a bearing of 190°, sketch the angle to express the direction of the ship.



The second method for expressing bearing starts with a north-south line and uses an acute angle to show the direction, either east or west, from this line. Figure 27 shows several sample bearings using this system. Either N or S always comes first, followed by an acute angle, and then E or W.

Method
Use an acute angle measured from South or North

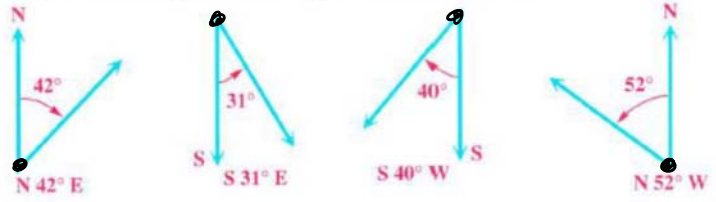
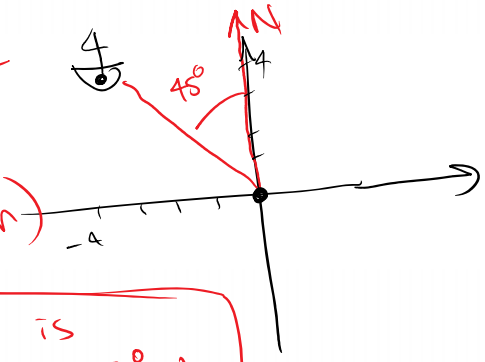


Figure 27

(42° East of North)

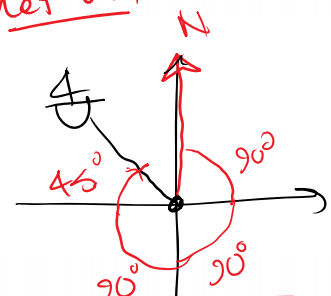
Example 2: Find the bearing of a ship located at the point (-4, 4). Express the bearing using both methods.

Method 2 (using acute angle from North or South)



Bearing is N 45° W.

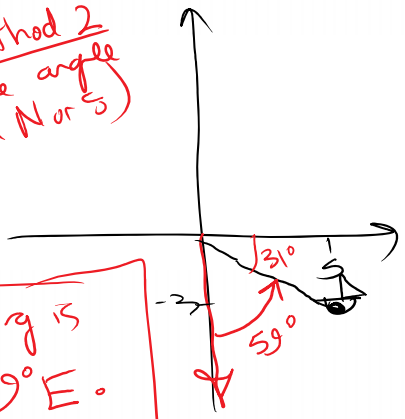
Method 1



Bearing is 315°

Example 3: Find the bearing of a ship located at the point (5, -3). Express the bearing using both methods.

Method 2 (acute angle from N or S)

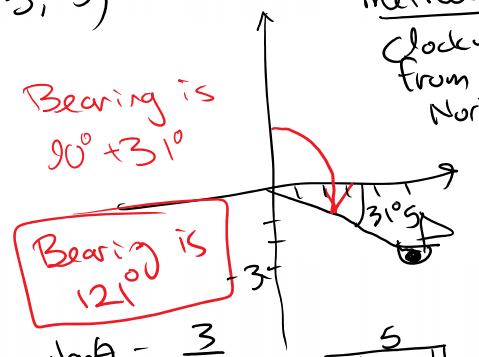


Bearing is S 59° E.

(5, -3)

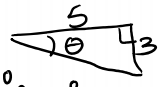
Method 1 Clockwise from North

Bearing is 90° + 31°



Bearing is 121°

$\tan\theta = \frac{3}{5}$



$\theta = \tan^{-1}(3/5) \approx 30.96° \approx 31°$

Example 4: Find the bearing of a ship located at the point (0, 6). Express the bearing using both methods.

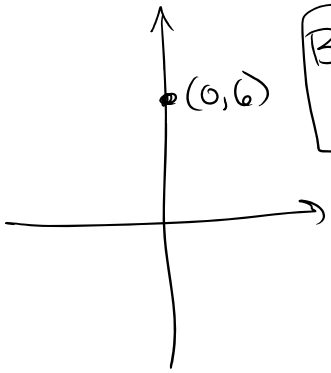
Method 1

Bearing is

N 0° E

or N 0° W

Method 1



Bearing is 0°

Example 6:

18. ***Distance Between Two Lighthouses*** Two lighthouses are located on a north-south line. From lighthouse A, the bearing of a ship 3742 m away is 129° 43′. From lighthouse B, the bearing of the ship is 39° 43′. Find the distance between the lighthouses.