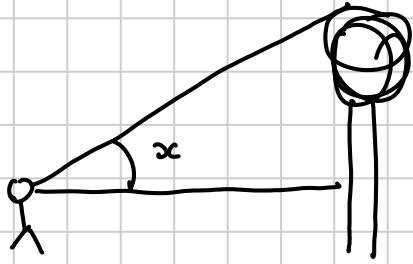


USING TRIGONOMETRY

Angle of Elevation or Depression

This is the angle we need to look up (or down) to see a certain object.

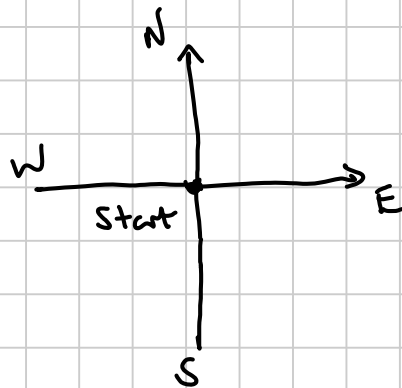


x = angle of elevation of top of tree



y = angle of depression of boat

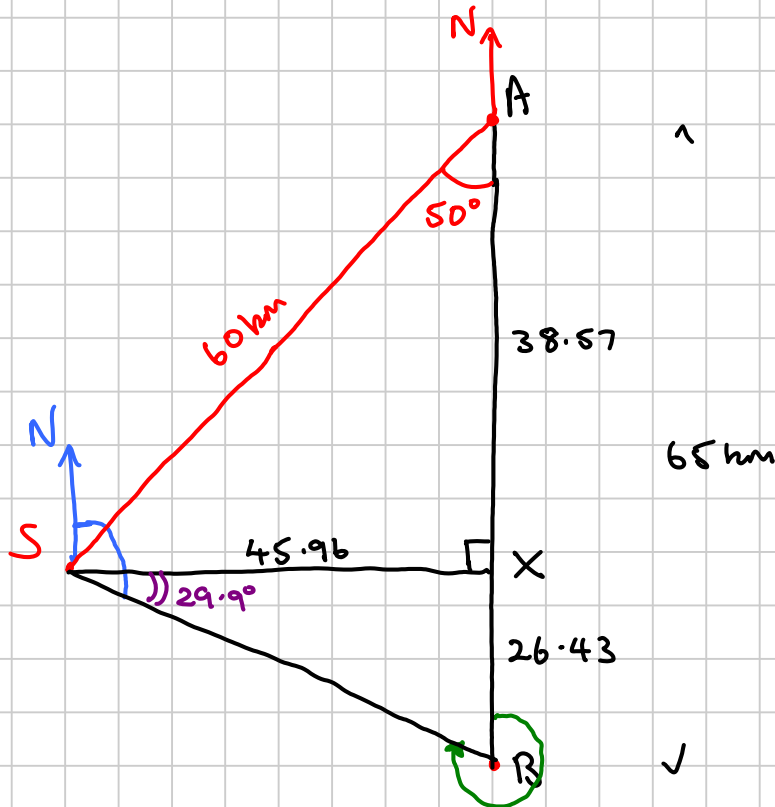
Bearings A bearing is a direction which an object is travelling in. Bearings are measured FROM NORTH, CLOCKWISE.



Compass direction	Bearing
E	90°
S	180°
W	270°
SE	135°
SW	225°

Example Port A is 65 km due North of Port B. A ship leaves port A sailing on a bearing of 230° . After sailing for 60 km it suffers a problem and decides to head for Port B for repairs.

How far, and on what bearing must it sail to port B? If a rescue boat sails from port B, on what bearing should it sail to reach the boat?



$$\frac{SX}{60} = \sin 50^\circ$$

$$SX = 60 \times \sin 50^\circ \\ = 45.96 \text{ km}$$

$$\frac{AX}{60} = \cos 50^\circ$$

$$AX = 60 \times \cos 50^\circ \\ = 38.57 \text{ km}$$

$$XB = 65 - 38.57 \\ = 26.43 \text{ km}$$

$$SB^2 = 45.96^2 + 26.43^2 \\ = 2811.01$$

$$SB = \sqrt{2811.01} = \underline{\underline{53.0 \text{ km}}} \quad (3 \text{ sf})$$

$$\tan \hat{XSB} = \frac{26.43}{45.96}$$

$$\hat{XSB} = \tan^{-1} \left(\frac{26.43}{45.96} \right) \\ = 29.9^\circ$$

$$\text{Bearing of B from S} = 90 + 29.9 \\ = \underline{\underline{119.9^\circ}}$$

$$\hat{XBS} = 180 - 90 - 29.9 \\ = 60.1^\circ$$

$$\text{Bearing of S from B} = 360 - 60.1 \\ = \underline{\underline{299.9^\circ}}$$

Note that the difference between these bearings is 180° .
This is always the case:

The bearing of X from Y and the bearing of Y from X
always differ by 180°