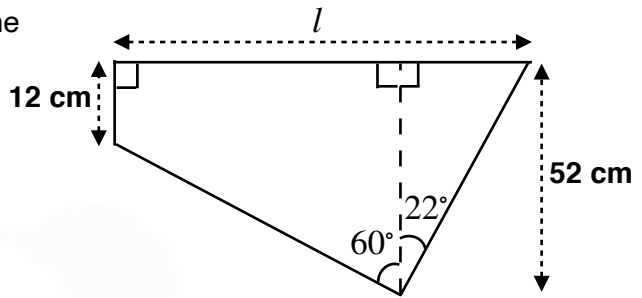


Bearings with trigonometry

Starter

1. **(Review of last lesson)** The diagram shows the frame of a bicycle. Find the length, l , of the top tube. Give your answer to 3 s.f..



Notes

Bearings are angles that are measured **clockwise from North**. They are used to give directions and to help pinpoint the location of places.

3 rules of bearings

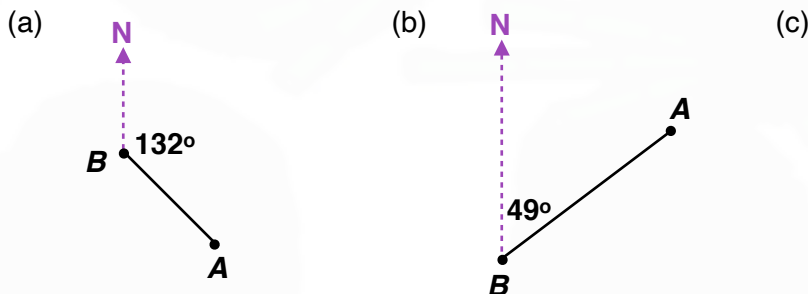
1. Bearings are measured from the North line.
2. Bearings are measured in the clockwise direction.
3. Bearings are expressed with 3-figures so 65° becomes 065° .

Bearing of A from B \Rightarrow start from B (so draw a north line at B).

Geogebra: [Bearings](#)

E.g. 1 Write down the bearing of A from B.

N.B. "Start from B" so there must be a north arrow at B.



Working: (a) 132°

Back bearings

The bearing of B from A \Rightarrow start from A (draw the North line at A)

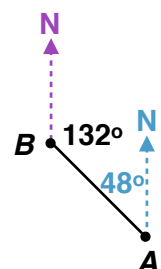
E.g. 2 For the diagrams of **E.g. 2(a)** and **E.g. 2(b)** above, calculate the bearing of B from A.

Working: "the bearing of B from A" – the "from A" means start from A. Therefore, a North arrow must be drawn **from A**.

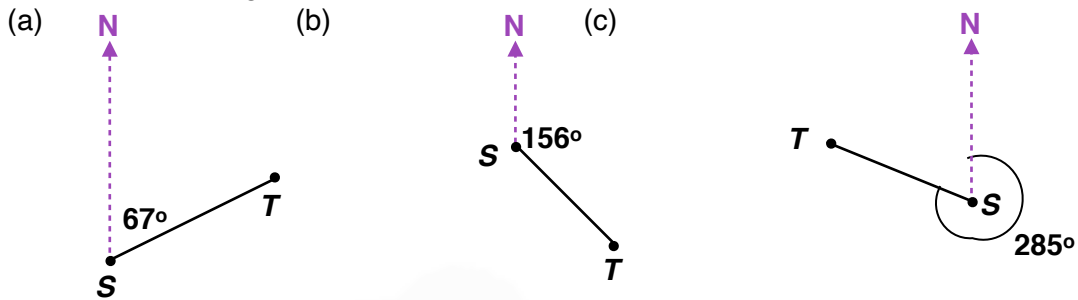
E.g. 2(a)

By allied angles, the angle between the line AB and A's North arrow is $180 - 132 = 48^\circ$.

So bearing of B from A is $360 - 48 = 312^\circ$



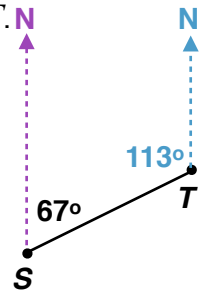
E.g. 3 What is the bearing of S from T ?



Working:

“the bearing of S from T ” – the “*from T*” means start from T . Therefore, a North arrow must be drawn *from T*.

- (a) By allied angles, the angle between the line ST and T 's North arrow is $180 - 67 = 113^\circ$.
So the bearing of S from T is $360 - 113 = 247^\circ$



Trigonometry questions often incorporate bearings in them.

E.g. 4 Sarah starts at point A and walks 9 km due east and then 5 km due south to reach point B . Calculate the bearing of B from A .

Working:

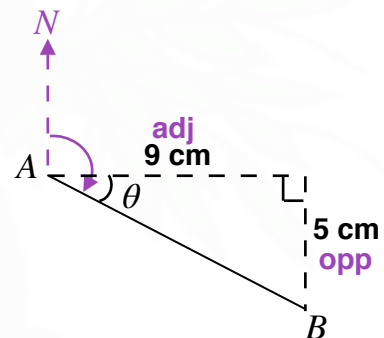
bearing of B from $A \Rightarrow$ start from $A \Rightarrow$ draw north arrow at A
opp and adj \Rightarrow tan

$$\tan \theta = \frac{\text{opp}}{\text{adj}}: \quad \tan \theta = \frac{5}{9}$$

$$\theta = \tan^{-1} \frac{5}{9}$$

$$\text{Bearing} = 90^\circ + \tan^{-1} \frac{5}{9} = 119^\circ$$

The bearing of B from A is 119° .



E.g. 5 A ship is due south of a lighthouse. It sails on a bearing of 058° for a distance of 76 km until it is due east of the lighthouse. How far is it now from the lighthouse?

Video: [Bearings](#)

Video: [Back bearings](#)

Video: [Position given bearings from two points](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook:

p568 M18.2 Qu 1-14 Protractor needed

A*-G class textbook:

p529 M18.2 Qu 1-11 Protractor needed

9-1 homework book:

p191 M18.2 Qu 1-7 Protractor needed

A*-G homework book:

p146 M18.2 Qu 1-6 Protractor needed

Summary

3 rules of bearings:

1. Bearings are measured from the North line.
2. Bearings are measured in the clockwise direction.
3. Bearings are expressed with 3-figures so 65° becomes 065° .

Bearing of A from B \Rightarrow start from B (so draw a north line at B).

