

## Decide if a Formula is a Perimeter, Area or Volume by considering Dimensions - SS18

Constants are dimensionless and can be ignored – e.g. 2 and  $\pi$  are dimensionless constants.

In the following section  $a, b, c, l, h, w$  are all measures of length.

The formula for **lengths** involve **lengths** or **added lengths**.

**E.g.**  $\rightarrow 2\pi l$  or  $2\pi(l+h)$  or  $l+h+w$

The formula for **areas** involve the **product of two lengths**.

**E.g.**  $\rightarrow 2\pi r^2$  or  $2\pi r(l+h)$  or  $l^2 + h^2 + w^2$

The formula for **volumes** involve the **product of three lengths**.

**E.g.**  $\rightarrow 2\pi r^3$  or  $2\pi r^2(l+h)$  or  $l^3 + h^3 + w^3$

### Strategy

1. Write without constants like 2, and  $\pi$ .
2. Replace lengths by  $cm$ , (areas by  $cm^2$ ).
3.  $cm \rightarrow$  length.  $cm^2 \rightarrow$  area.  $cm^3 \rightarrow$  volume.

**Example**  $2(3a + \pi b)c^2$

1.  $(a + b)c^2$
2.  $(cm + cm) cm^2 = (cm) cm^2$   
 $\leftarrow \begin{matrix} \text{cm} + \text{cm} \text{ are more } \text{cm}^2\text{'s!} \\ \text{= cm}^3 \end{matrix}$
3. Volume formula

**Example**  $\sqrt{a^2 + b^2}$

1.  $\sqrt{a^2 + b^2}$
2.  $\sqrt{cm^2 + cm^2} = \sqrt{cm^2} = cm$   
 $\leftarrow \begin{matrix} \text{cm}^2 + \text{cm}^2 \text{ are more } \text{cm}^2\text{'s!} \end{matrix}$
3. Length formula

**Your Turn!!** What types of formula are: a)  $2\pi bc$     b)  $\pi^2(bc + ac)$     c)  $(\pi c^2 + \frac{1}{2}ab)$     d)  $\frac{\pi c^2 - \frac{1}{2}ab}{h}$

**Extra note**  $\theta$  is a measure of length (angular length), but  $\sin\theta$  is a constant and can be ignored.

**Extra Your Turn!!** What types of formulae are e)  $2a\theta$     f)  $3a \sin\theta$

### RAPID 'ACID' TEST – Blank out the page above before answering these!

Identify these formulae as perimeter (length), area or volume: 1.  $\frac{3(ac^2 - abc)}{4}$     2.  $\frac{2\pi c^2 - ab}{h}$     3.  $2abc$

From p71...

### Draw/Sketch/Interpret a Diagram using Bearings – SS6

Pythagoras and Trigonometry questions are sometimes asked through a bearings style question. In such questions you might need to draw or interpret a bearings diagram.

#### Reminders

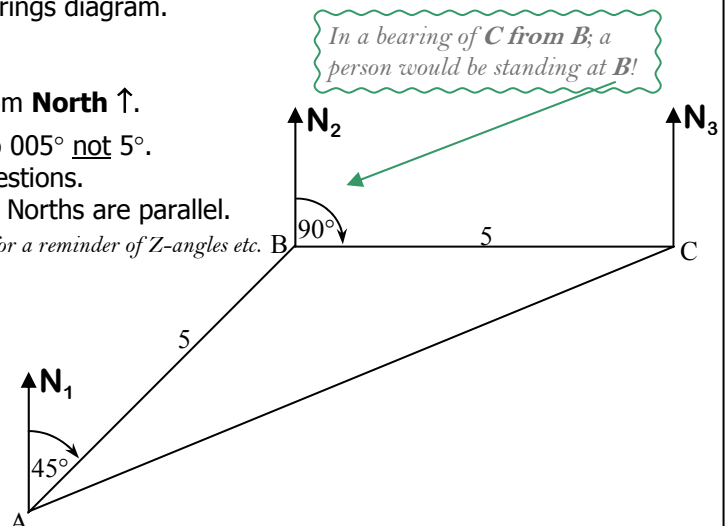
1. Bearings are always measured **clockwise** from **North**  $\uparrow$ .
2. Bearings are always given as **three figures**, so  $005^\circ$  not  $5^\circ$ .
3. Look carefully at the words 'to' and 'from' in questions.
4. Angles can be calculated using the fact that the Norths are parallel.

For example  $\angle ABN_2$  is  $180 - 45 = 135^\circ$  see iSS1 for a reminder of Z-angles etc.

#### Example

Draw a diagram where a ship travels **from A to B** on a bearing of  $045^\circ$  a distance of 5km, then **to C from B** on a bearing of  $090^\circ$  a distance of 5km. It then travels back **to A from C**.

**Solution** See Diagram  $\rightarrow$



#### Your Turn!!

In the  $\triangle ABC$ ,  $\angle ABC = 360 - 90 - 135 = 135^\circ$  (Angles at a point sum to  $360^\circ$ ).

- a) Calculate the other angles in the  $\triangle ABC$ .
- b) State the bearings of i) A from B    ii) B from C    iii) A from C.

### RAPID 'ACID' TEST – Blank out the page above before answering these!

1. A ship travels to B from A on a bearing of  $270^\circ$  a distance of 5km and then from B to C a distance of 5km on a bearing of  $060^\circ$ .
  - a) Sketch a diagram to represent this journey.
  - b) Calculate the bearing of i) C from A    ii) A from C.