

Essential knowledge

- Know line and angle notation
- Understand bearings
- Know the parts of a circle
- Calculate the area of circles and sectors
- Know and use angle facts
- Know how to calculate and determine vectors

Key Vocabulary

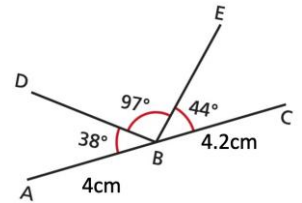
- Angle:** a measure of turn
- Bearing:** an angle in degrees, measured clockwise from north, written as a 3-digit number
- Radius:** line segment from the centre of a circle to the circumference.
- Diameter:** any straight line segment that passes through the centre of the circle and whose endpoints lie on the circle.
- Circumference:** the perimeter of a circle.
- Pi:** the ratio of a circle's circumference to its diameter, ≈ 3.14159
- Vector:** a vector indicates both size and direction

Prior learning links

- Developing geometric reasoning (Y7)
- Area of trapezia and circles (Y8)
- Reasoning with geometry (Y9)

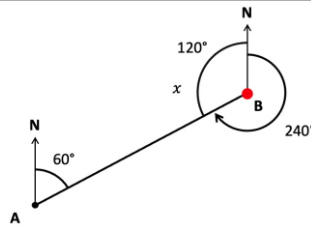
Angle and line notation

Line segment $BC = 4.2\text{cm}$
 $\angle ABC = 38^\circ$
 $\angle DBE = 97^\circ$
 $\angle ABE = 135^\circ (38^\circ + 97^\circ)$

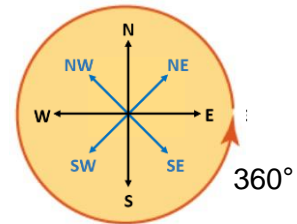


Bearings

A bearing is an angle in degrees measured clockwise from north, given as a three-figure number. For example, 30° clockwise from north is written as 030°



In the example (left) the bearing from A **to** B is 60° (clockwise from north). The bearing of A **from** B is 240° (clockwise from north).



Parts of a circle

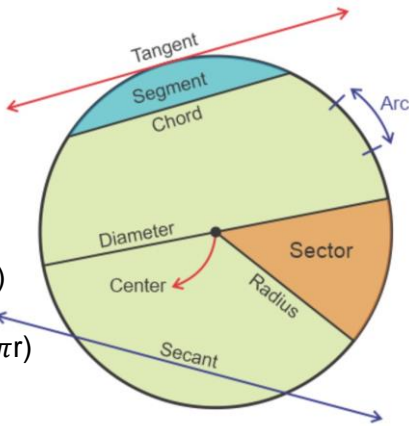
The radius (r) of a circle is $\frac{1}{2}$ the diameter (d).

The length of the circumference is:

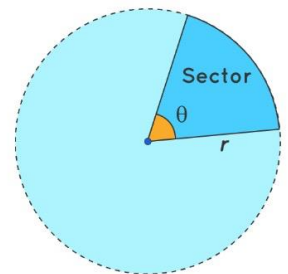
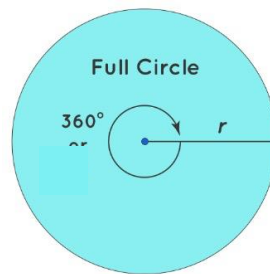
$$\pi \times \text{diameter } (\pi D)$$

or ...

$$2 \times \pi \times \text{radius } (2\pi r)$$



Area of circles and sectors



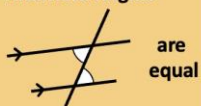
Area of a circle = πr^2 Area of sector = $\frac{\theta}{360} \times \pi r^2$
 $(\pi \times \text{radius}^2)$ **Area is measured in units²**

Angle facts

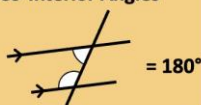
Corresponding Angles



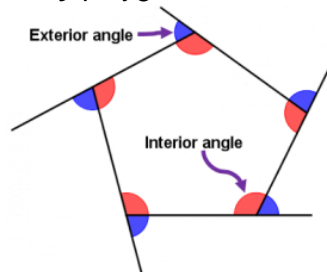
Alternate Angles



Co-Interior Angles

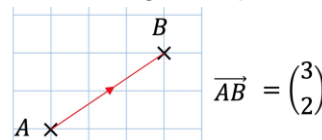


The exterior angles of **any** polygon sum to 360°

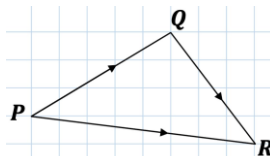


The interior angles of a **regular** polygon sum to $(n-2) \times 180$ (where n is the number of sides).

Vectors show both direction and magnitude (size). The following example shows vector A to B $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$.



If the vector was reversed (i.e. B to A) it would be written as $\overrightarrow{BA} = \begin{pmatrix} -3 \\ -2 \end{pmatrix}$



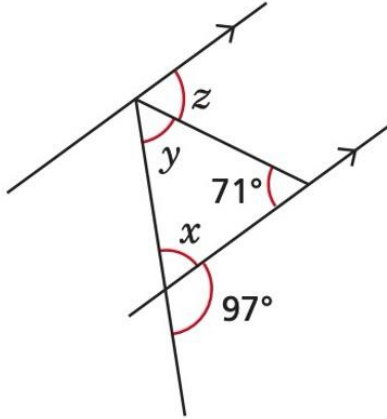
Vectors can be added or subtracted.

$$\overrightarrow{PQ} + \overrightarrow{QR} = \overrightarrow{PR}$$

$$\begin{pmatrix} 5 \\ 3 \end{pmatrix} + \begin{pmatrix} 3 \\ -4 \end{pmatrix} = \begin{pmatrix} 8 \\ -1 \end{pmatrix}$$

Prior learning links

What are the sizes of angles x , y and z ?
How do you know? (state the rules for each angle)



Key Vocabulary

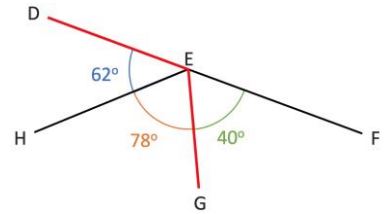
Use cover, look, write, check to write the definitions ...

- Angle:**
- Bearing:**
- Radius:**
- Diameter:**
- Circumference:**
- Pi:**
- Vector:**

Angle and line notation

What is the size of ...

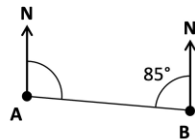
- $\angle DEH$
- $\angle FEG$
- $\angle HEF$



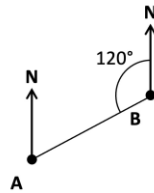
Bearings

Use your understanding of angle rules in parallel lines to help you calculate these bearings. NB: bearings are measured clockwise from north.

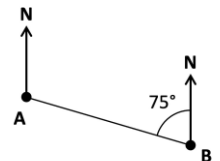
1) Calculate the bearing of B from A.



2) Calculate the bearing of A from B.

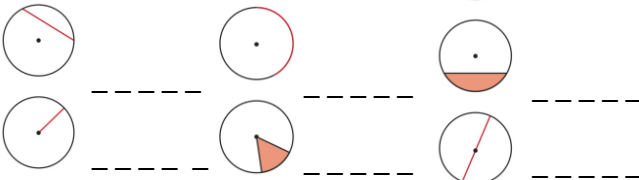


3) Calculate the bearing of A from B.

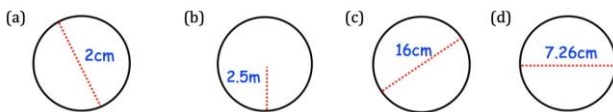


Parts of a circle

Label the parts of each circle

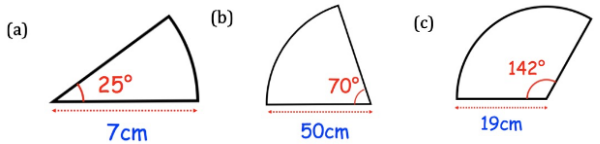


Calculate the circumference of each circle



Area of circles and sectors

1. A circle has a diameter of 5cm. Calculate its area (to 2 decimal places)
2. A circle has an area of 30cm^2 . Calculate its radius (to 2 decimal places)
3. Calculate the area of the following sectors to 2 decimal places (include suitable units)



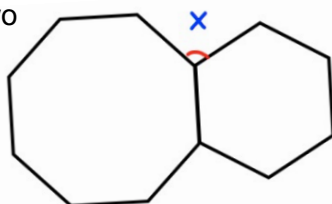
Angle facts

Calculate the size of the exterior angle in ...

1. A regular hexagon
2. A regular octagon
3. A regular decagon

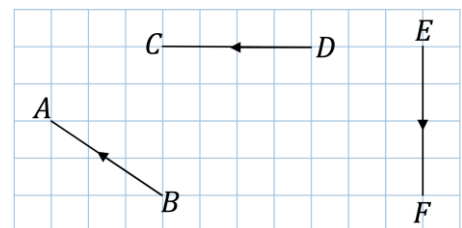
The interior angle of a regular polygon is 168.75°
Calculate the number of sides the polygon has.

The diagram shows two regular polygons.
Calculate the value of angle x



Vectors

Write the vectors shown using correct notation.



Write **a** as a column vector

Write **b** as a column vector

Write **a + b** as a column vector

