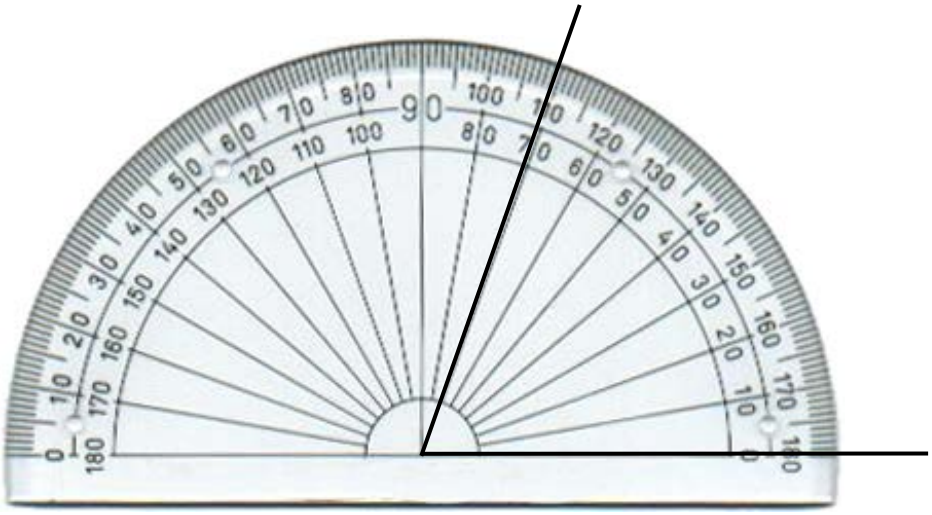
Learner's Worksheet

Measuring angles

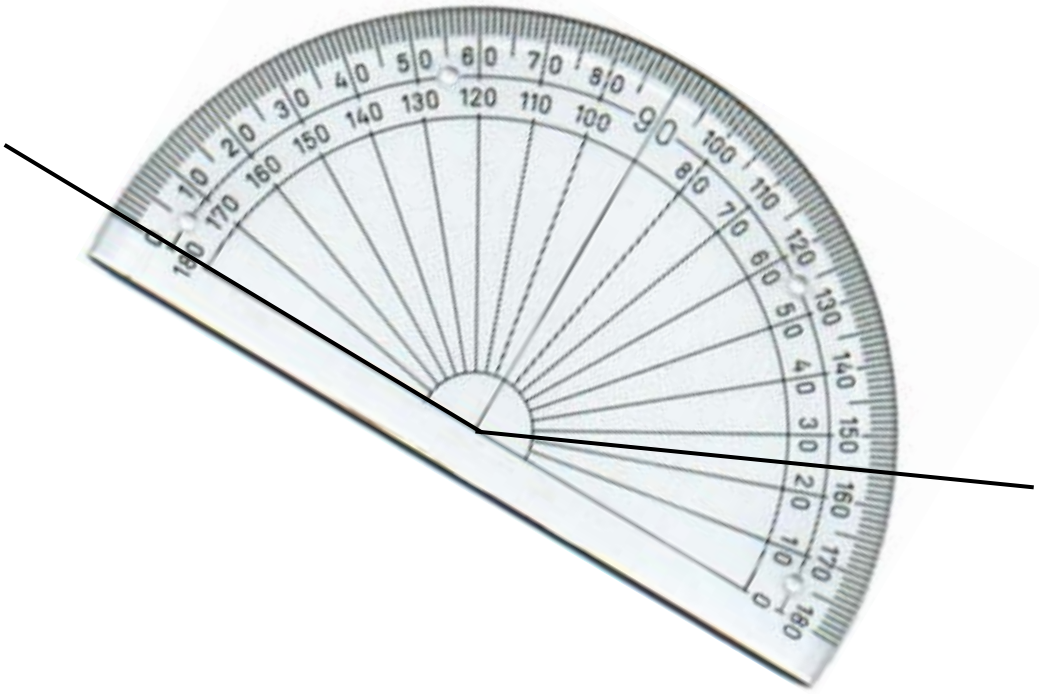
In the diagram below we have an angle drawn in black and a protractor placed on the angle.



Ensure that the centre of the protractor fits exactly onto the vertex of the angle and that one arm of the angle is on 0°. Now read from the protractor where the other arm of the angle falls.

Before you measure the angle decide whether the angle is more than or less than 90°.

Since this angle is less than 90° it must measures 70°. The other option of 110° would be too big.

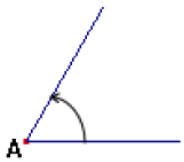


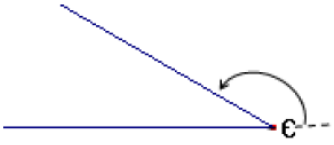
In this example the angle is more than 90° so the angle measures 155°.

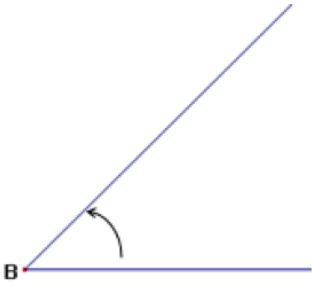
1.

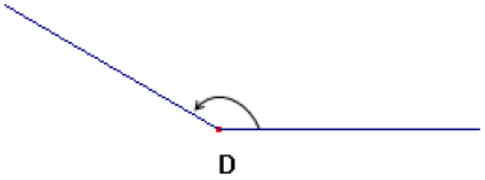
a) Using your protractor measure the size of angles A-E. Be as accurate as possible.

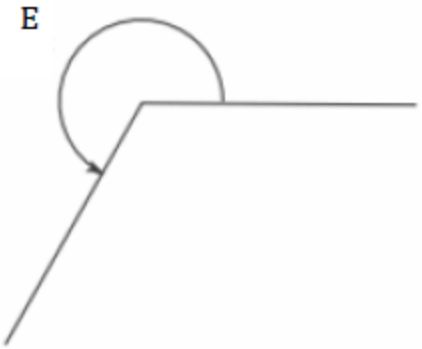
b) Describe angles A-E using one of these words; acute, obtuse or reflex.











Drawing angles

Here are the steps to drawing an angle using a protractor and a ruler.

Draw a straight line. This will be one arm of the angle.

Place a dot at one end of the line. This dot represents the vertex of the angle.

Ensure that the centre of the protractor fits exactly onto the dot at the end of the line.

Also ensure that the line matches with the baseline on the protractor.

Find the required angle on the protractor scale and mark a dot beside it.

Join this dot to the first dot to form the second arm of the angle.

Label the angle with capital letters.

Example; Draw ∠ ABC = 60° using a ruler and protractor.

Draw a straight line BA.

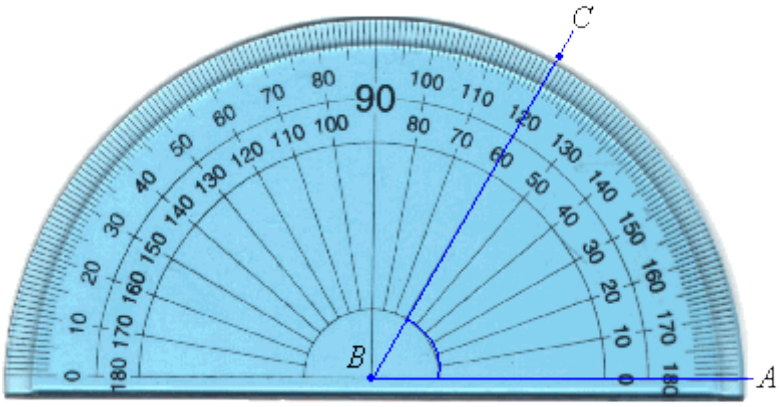
Place a dot at B. This dot represents the vertex of the angle.

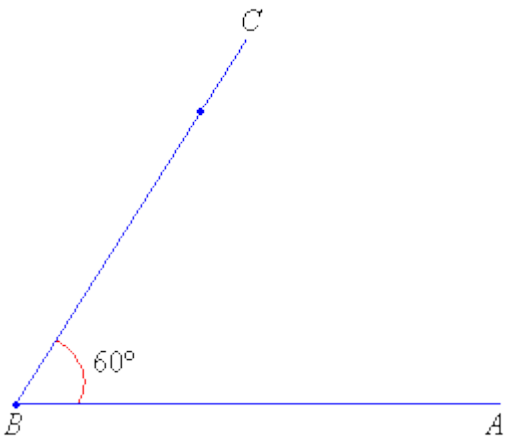
Place the centre of the protractor at B and the baseline of the protractor along the arm BA.

Find 60° on the scale and mark a small dot at the edge of the protractor.

Join the vertex B to the small dot using a ruler to form the second arm, BC of the angle.

Mark the angle with a small arc as shown below.





Example; Draw ∠ PQR = 240° using a ruler and protractor

240° is a reflex angle. A reflex angle is greater than 180° and less than 360°

To draw a reflex angle follow the steps below

Subtract 240° from 360°. This gives 120°

Now draw the angle 120°.

First draw a straight line PQ.

Place a dot at Q. This dot represents the vertex of the angle.

Turn the protractor upside down and place the centre of the protractor on Q.

Line up the baseline of the protractor with the line PQ.

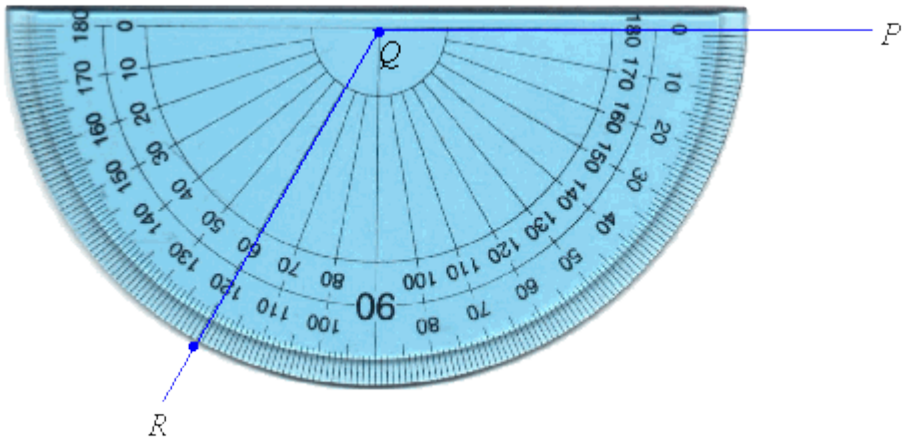
Use the outer scale of the protractor to measure 120° and mark with a dot.

Name the dot R.

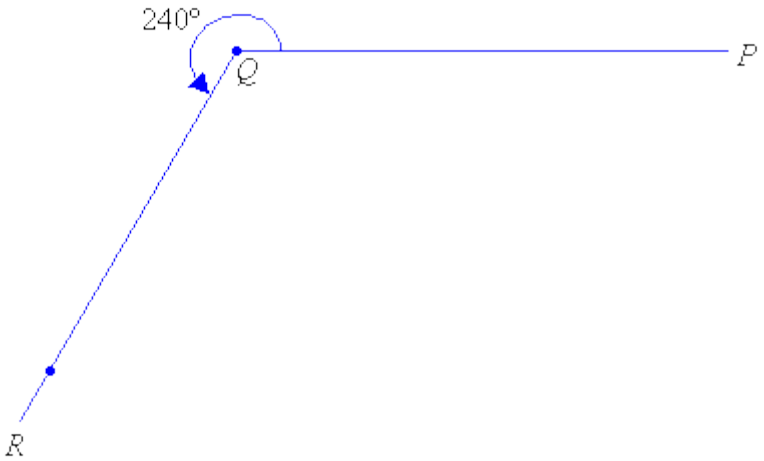
Remove the protractor and join the vertex Q to the dot R with a straight line.

This is the second arm of the angle QR.

The required angle is outside the one that has been drawn. (360°-120° = 240°)



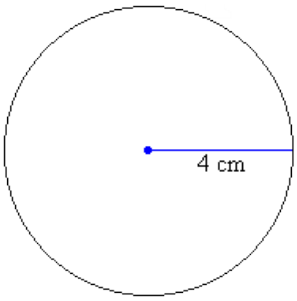
Mark the angle with a small arc as shown below.



2. Use a ruler and protractor to draw an angle of
   a) 52°
   b) 114°
   c) 235°

Example Use a compass and a ruler to draw a circle of radius 4 cm.

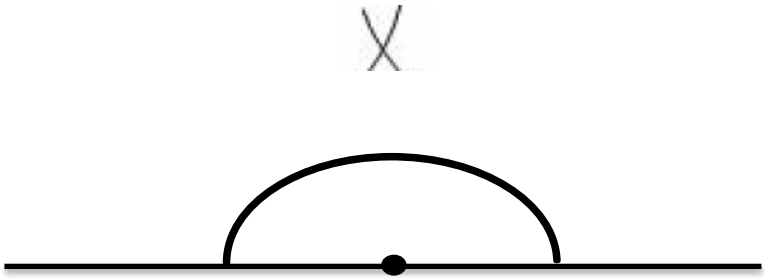
Use a ruler to set the distance from the point of the compass to the pencil's lead at 4 cm.
Place the point of the compass on the paper. This will be the centre of the circle.
Draw the circle by turning the compass through 360º.

3. 

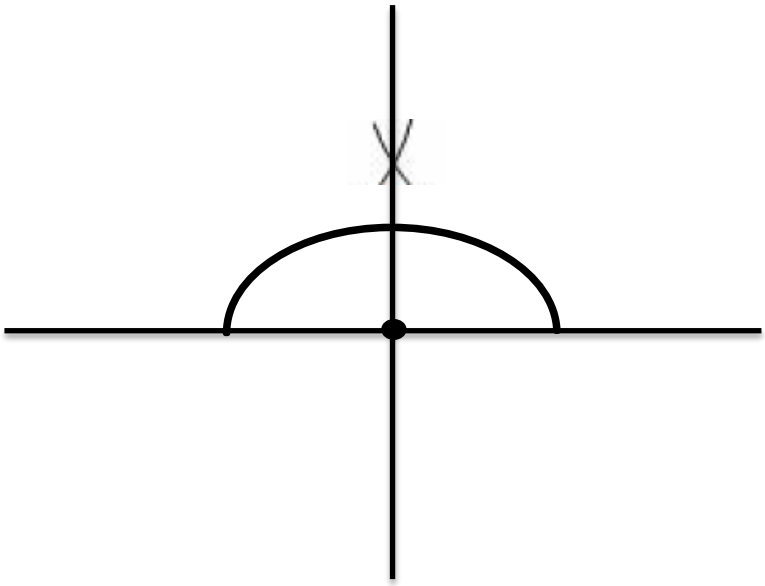
   a) Use a compass and a ruler to draw a circle of radius 3 cm.
   b) Use a compass and a ruler to draw a circle of diameter 10 cm.

4. **Challenge**
   a) How could you draw two perpendicular lines using a straightedge and a protractor?
   b) How could you draw two parallel lines using a straightedge and a protractor?

5. Follow the steps below to draw two perpendicular lines using a ruler and a compass
    - Draw a straight line and mark a dot on the line.
    - Open the compass to a length shorter than the line
    - Place the compass point on the dot and draw a semi-circle on the line
    - Make the compass longer. Place the compass point at one end of the semi-circle and draw a mark above the semi- circle. Do the same from the other end of the semi-circle so that the marks cross-over.
    - Join the points where the arcs cross with a ruler



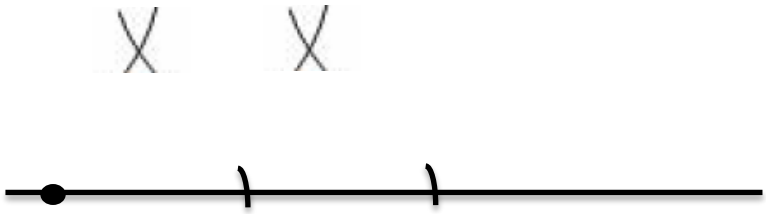
    - Draw a line from the cross-over through the dot on the line.



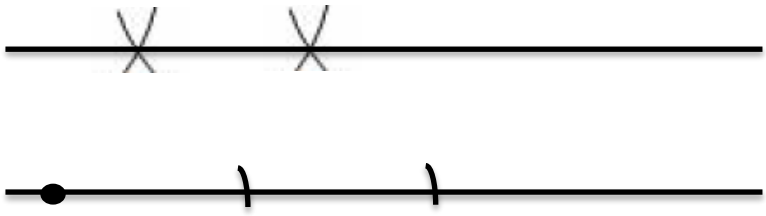
    - The two lines you have drawn will be perpendicular.

6. Follow the steps below to draw two parallel lines using a ruler and compass.
    - Draw a straight line and mark a dot on it.
    - Set your compass to a length much shorter than the length of the line.
    - Place the point of the compass on the dot and draw a mark on the line.
    - Now place the point of the compass on this mark and make another mark further along the line. Keep the compass at the same length

- The compass should still be at the same length
- Place the compass point back on the first dot and make a mark above the line
- Move the compass point to the second mark and do the same so that the marks cross-over.



- Do the same with the second and third mark so that the marks cross-over.



- Draw a straight line through the cross-over points
- The two lines you have drawn will be parallel.

The answers to this worksheet can be found on the teacher's notes on angles