

Theorems 6

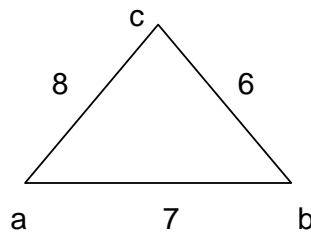
This class has all the constructions that we need to be able to do.

To draw Triangles

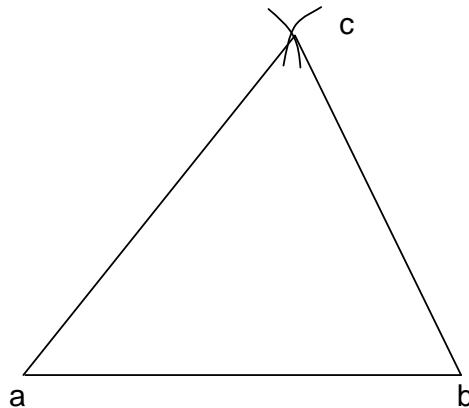
Type 1 Draw a triangle given three sides.

Example 1 Draw triangle abc where $|ab| = 7\text{cm}$, $|ac| = 8\text{cm}$ and $|bc| = 6\text{cm}$.

First thing to do is to draw a shadow diagram for a rough idea of what the triangle is going to look like.



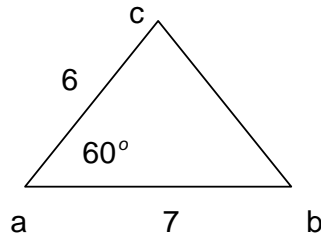
Draw the line ab so that it is 7 cm long.



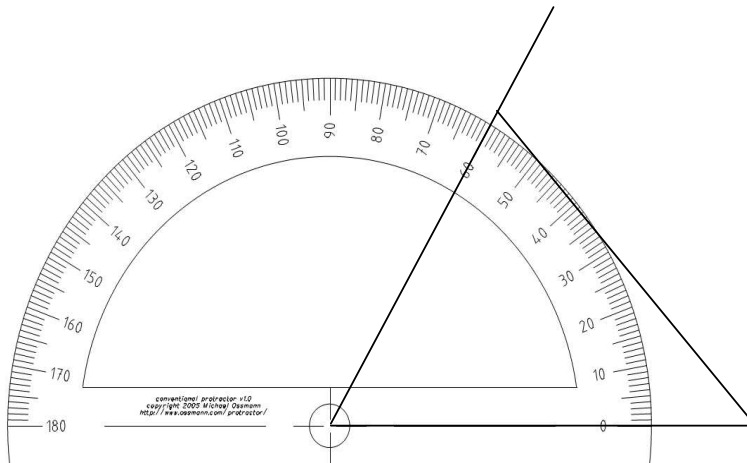
Type 2 Draw a triangle given two sides and included angle.

Example 2 Draw triangle abc where $|ab| = 7\text{cm}$, $|ac| = 6\text{cm}$ and $|\angle cab| = 60^\circ$.

First thing to do is to draw a shadow diagram for a rough idea of what the triangle is going to look like.



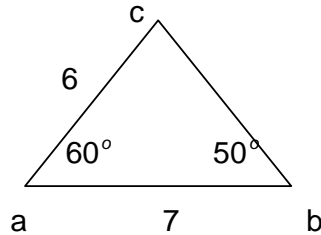
Draw the line ab so that it is 7 cm long.



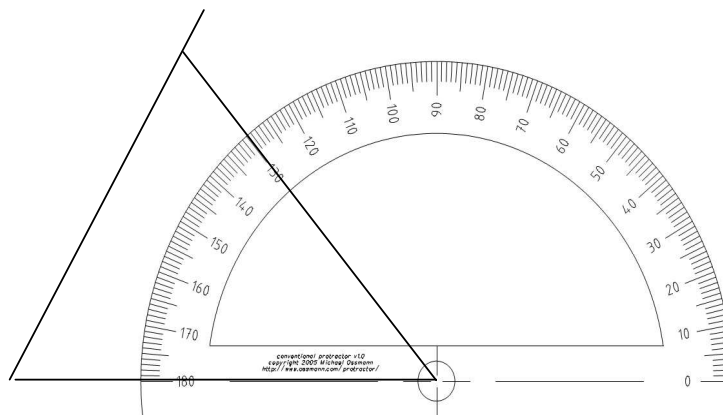
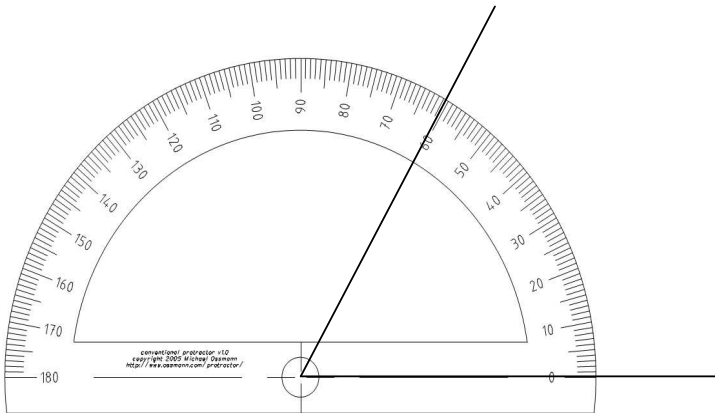
Type 3 Draw a triangle given one side and two angles.

Example 3 Draw triangle abc where $|ab| = 7\text{cm}$, $|\angle cab| = 60^\circ$ and $|\angle cba| = 50^\circ$.

First thing to do is to draw a shadow diagram for a rough idea of what the triangle is going to look like.

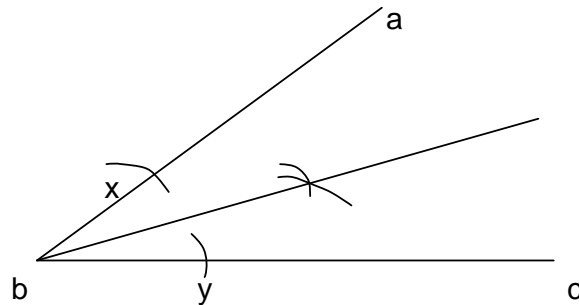


Draw the line ab so that it is 7 cm long.



To Bisect an Angle

Example 4 Bisect an angle

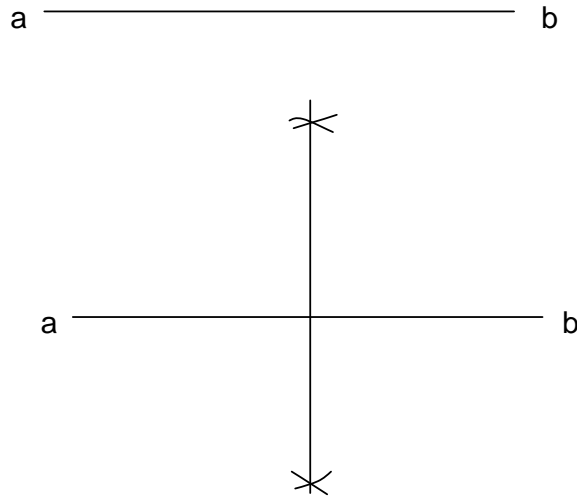


Draw any angle abc

- Step 1 Get a compass and stretch it out a small length (radius).
- Step 2 Put the point of the compass at the point b and mark off two arcs. One on the line ab to hit ab at the point x and another the same length on the line bc to hit bc at the point y .
- Step 3 Without changing the radius of the compass pick it up and put its point on x . Form an arc.
- Step 4 Pick the compass up again and this time put its point on y and form another arc.
- Step 5 Join b to the point of intersection of the last two arcs to get our answer.

To draw the Perpendicular bisector of a line segment

Example 5 Construct the perpendicular bisector of line segment [ab]



Step 1 On a compass stretch out a distance which is over half the distance of the line ab

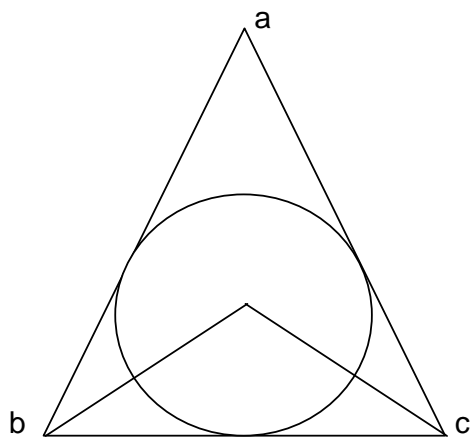
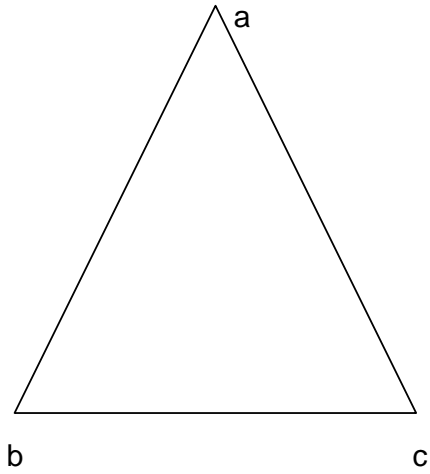
Step 2 Put the point of the compass on the point a and make an arc above and below the line ab.

Step 3 Move the point on the curve to point b and without changing its length draw an arc above and below the line ab.

Step 4 Join where the two arcs meet to get the answer.

To construct the incircle of a triangle

Example 6 Draw the incircle of the triangle abc



Step 1 Bisect the angle abc.

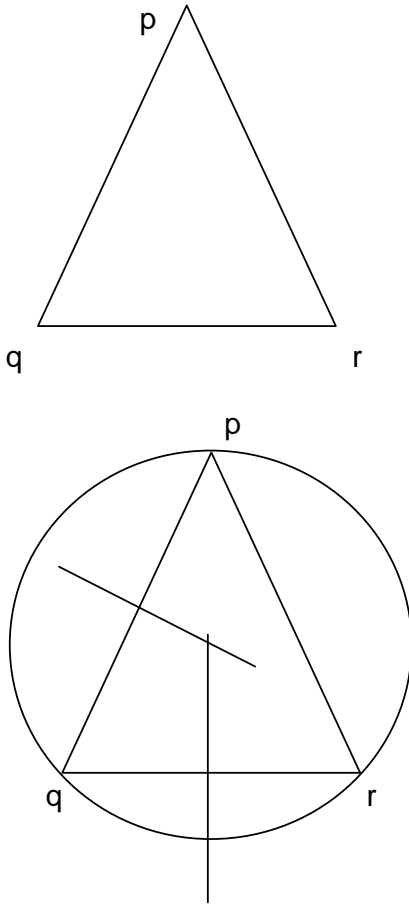
Step 2 Bisect the angle acb.

Step 3 Where the two lines meet is the centre of our incircle.



To construct the circumcircle of a triangle

Example 7 Draw the circumcircle of the given triangle pqr



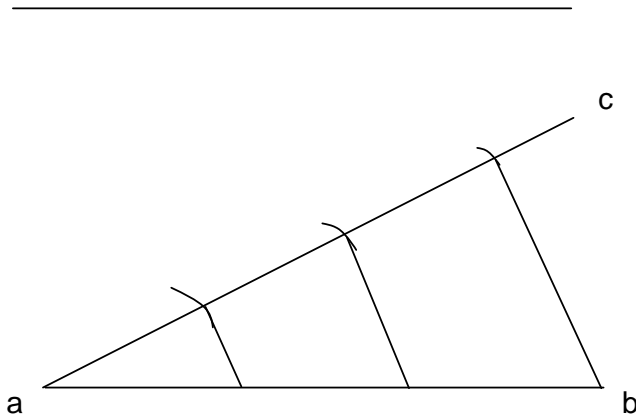
Step 1 Draw the perpendicular bisector of qr.

Step 2 Draw the perpendicular bisector of pq.

Step 3 Where the two lines meet is the centre of the circumcircle.

To divide a line into 3 equal parts

Example 8 Divide the line segments $[ab]$ into 3 equal parts.



Step 1 From the point a draw the line ac at any angle.

Step 2 Get a compass and stretch it out a small radius.

Step 3 Put the point of the compass on the point a and form an arc on the line ac . Move the compass to this new point and form a arc, do the same process one more time.

Step 4 Take the last point on ac and join it back to b .

Step 5 Draw two lines parallel to the last line. This has divided ab into 3 equal parts.