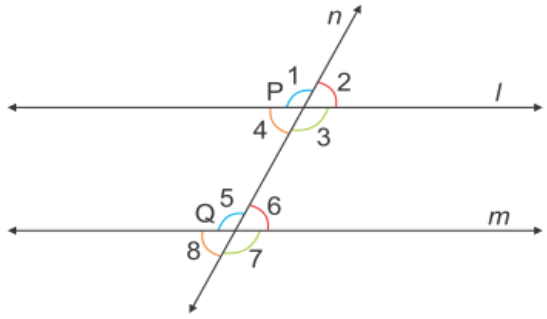
Properties of Angles and Lines - Including Parallel

Conditions for Parallel Lines

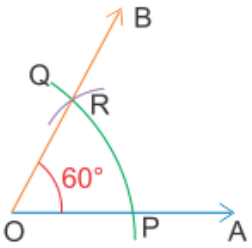


Lines *l* and *m* are parallel if any of the following is true:

- Pairs of **alternate angles** are equal.
  $\angle 3 = \angle 5$, $\angle 1 = \angle 7$
- Pairs of **corresponding angles** are equal.
  $\angle 2 = \angle 6$, $\angle 4 = \angle 8$
- The sum of the **interior (or exterior) angles** on the same side of the transversal is **180°**.
  $\angle 3 + \angle 6 = 180^\circ$ *or*
  $\angle 1 + \angle 8 = 180^\circ$

Constructions of Specific Angles

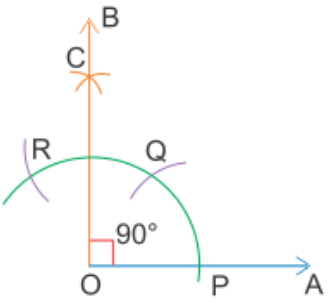
i Draw a ray OA
ii Using a compass, with O as centre and any radius draw an arc PQ which cuts OA at P
iii With P as centre and same radius draw an arc to cut the arc PQ at R
iv Join OR and produce it to form the ray OB
v The ∠AOB thus formed measures 60°



Note: To get angle of 30°, follow the above steps and then draw a angle bisector.

---

i Draw a ray OA
ii With O as centre and any radius draw an arc which cuts OA at P
iii With P as centre and same radius draw an arc to cut the arc in step (ii) at Q
iv With Q as centre and same radius as in step (ii) draw an arc to cut the arc in step (ii) at R
v With Q as centre and same radius draw an arc
vi With R as centre and same radius draw an arc, to cut the arc in Step (v) at C
vii Join OC and produce it to B
viii The ∠AOB thus formed measures 90°



Note: To get angle of 45°, follow the above steps and then draw a angle bisector
To get angle 120°, follow steps (i) to (iv) above, and join OR and produce it to B.

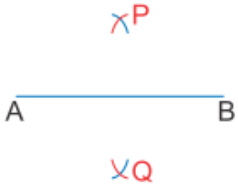
Constructions

Drawing a Perpendicular Bisector

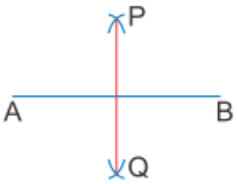
i. Draw a line segment AB of given length by using a scale

ii. With A as centre and radius more than half of AB, draw arcs on each side of AB

iii. With B as centre and same radius, repeat step (ii)

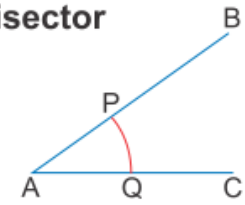


iv. Join line segment PQ, which is a perpendicular bisector to AB

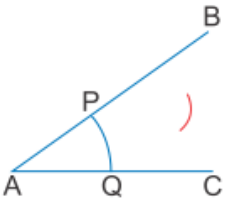


Drawing an Angle Bisector

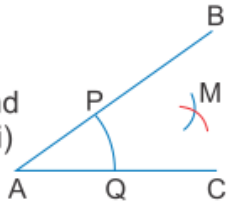
i. With A as centre and any radius, draw an arc cutting AB at P and AC at Q



ii. With P as centre and radius more than half of PQ, draw an arc



iii. With Q as centre and same radius repeat step (ii)



iv. Join AM and produce it to AR. The ray AR is bisector of ∠BAC