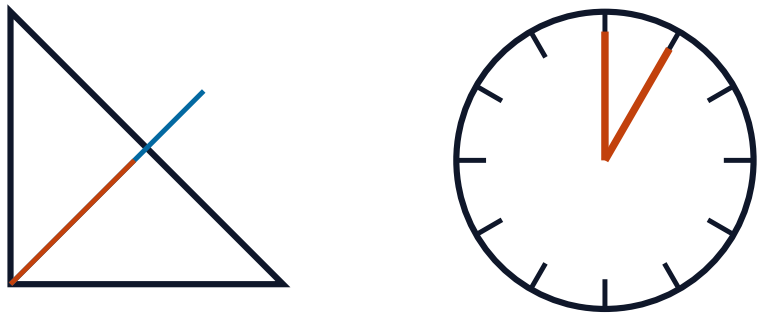
Mathematics 10-3

Unit G: Geometry and trigonometry

Drawing and bisecting angles

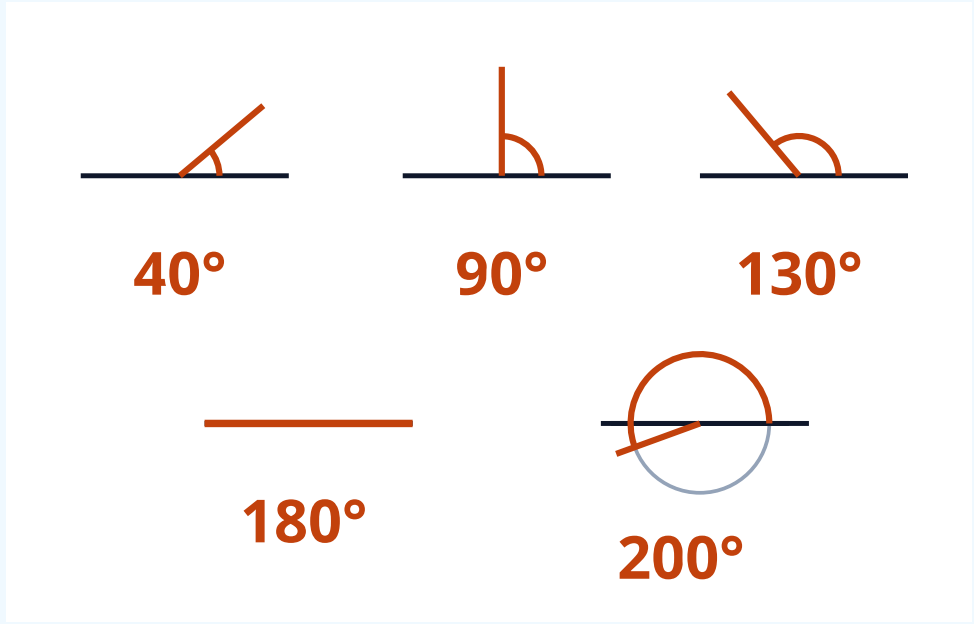
A paper corner and a clock

- A square corner of paper is 90 degrees.
- Fold it in half and the crease is 45 degrees.
- Fold that half again and the crease is 22.5 degrees.
- On a clock, the hour marks are 30 degrees apart, because 360 divided by 12 is 30.



Five angle names and a protractor

- An acute angle is under 90 degrees.
- A right angle is 90 degrees.
- An obtuse angle sits between 90 and 180.
- A straight angle is 180.
- A reflex angle sits between 180 and 360.



Key terms

acute angle

An angle smaller than a square corner, so its measure is under 90 degrees. (< 90)

obtuse angle

An angle larger than a square corner and smaller than a straight line, between 90 and 180 degrees. (90 to 180)

reflex angle

An angle that goes past a straight line and stops before a full turn, between 180 and 360 degrees. (180 to 360)

bisect

To cut an angle into two equal angles, such as a 70 degree angle cut into two 35 degree angles. (half)

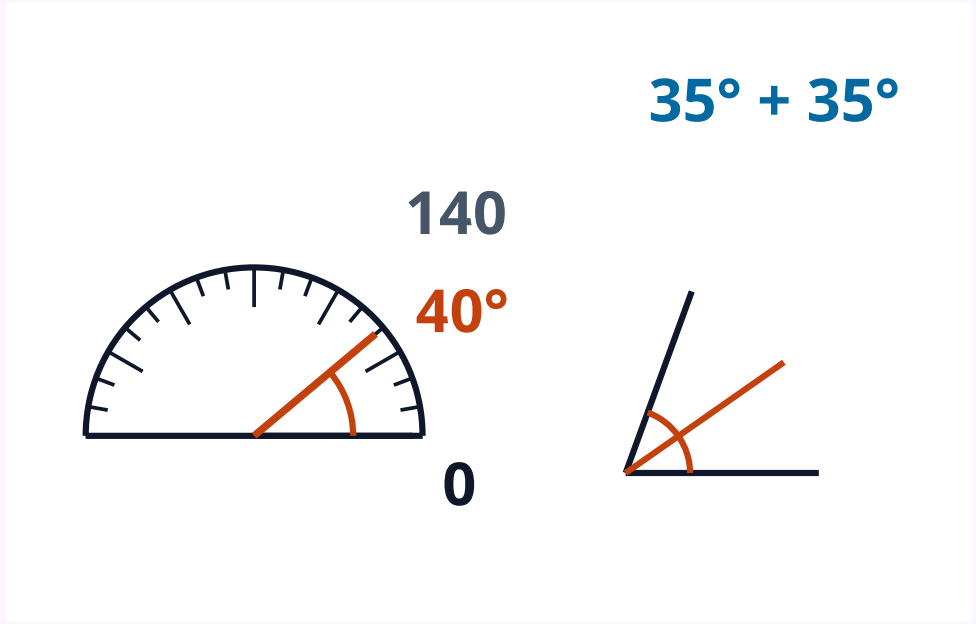
Key terms

protractor

A semicircular tool with two number scales, used by placing the centre on the vertex and reading the scale that starts at 0 on the first ray. (0 to 180)

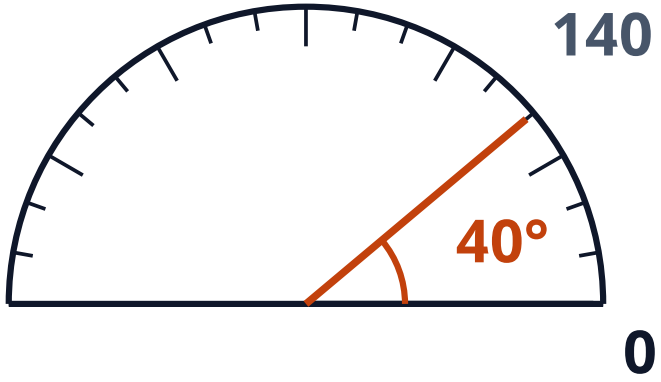
Protractors and angle bisectors

- Read the protractor scale whose 0 sits on the first ray.
- A 40 degree opening is recorded as 40 degrees.
- Bisect means cut into two equal angles.
- A 70 degree angle bisects into two 35 degree angles.



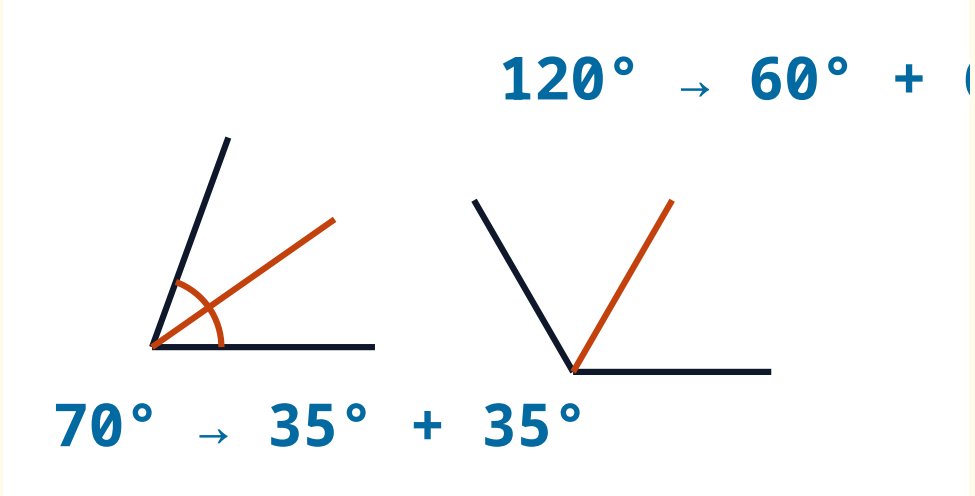
Estimating and measuring 40 degrees

- The referents are 22.5, 30, 45, 60, 90, and 180 degrees.
- A 40 degree opening is a little under the 45 degree paper fold, so the estimate is 40.
- The protractor confirms 40 degrees when the 0 of the scale sits on the first ray.



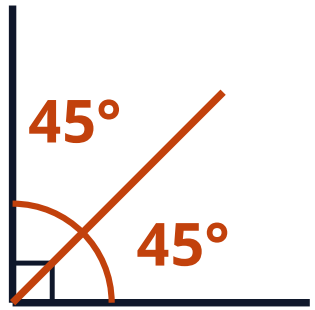
Bisect 70 degrees and 120 degrees

- Half of 70 is 35, so the bisector makes two 35 degree angles.
- Half of 120 is 60, so the bisector makes two 60 degree angles.
- A compass and straightedge, a protractor, or geometry software can each draw that bisector.



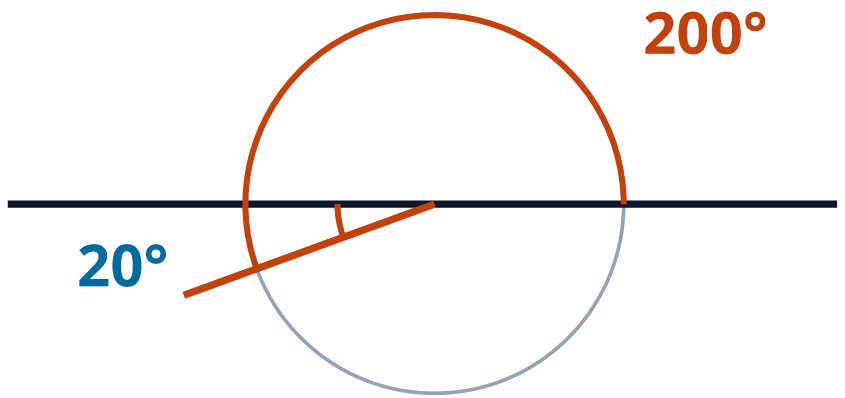
A 90 degree mitre

- A corner trim meets at 90 degrees, and the mitre cuts that corner in half.
- Half of 90 is 45, so each mitre piece is cut at 45 degrees.
- Check the cut against the paper fold.
- The fold and the saw mark should match.



A reflex angle past a straight line

- A straight line is 180 degrees.
- About 20 degrees past that line is about 200 degrees.
- The reflex angle is the long way around, between 180 and 360.
- You can copy an angle with a protractor, a compass and straightedge, a carpenter square, or geometry software.



straight line plus about 20°

Angle check

- Bisect an 80 degree angle and name the two resulting angles.
- A drawn opening looks a little under a 45 degree fold.
- Which protractor reading fits, 40 degrees or 140 degrees?

