LEARNER GUIDE

The compass and the circle

Constructions, Loci and Bearings · Lesson 1. A short guide to walk beside you — read as much or as little as helps. *Connection before curriculum. Always.*

What this lesson is about

Most drawing is a little approximate. This lesson is about making something **exact** instead — and the tool that does it is a pair of **compasses**. The secret is what a **circle** really is: not just a round shape, but **every point the same distance from a centre**. That fixed distance is the **radius**. A compass simply holds that distance while it swings, so every mark it makes is guaranteed the same distance from where its point sits. From that one idea you will copy a length and construct an **equilateral triangle** — all three sides equal — with no measuring at all.

What you are learning to notice

- A **circle** is the set of all points a fixed distance (the **radius**) from its **centre**.
- An **arc** is part of that circle — so every point on an arc is the same distance from the compass point.
- Where two arcs of radius AB cross, that crossing is the same distance from both A and B.
- Because both arcs share the radius AB, the triangle they build has three equal sides — it is exact, not estimated.

Moving through it, one step at a time

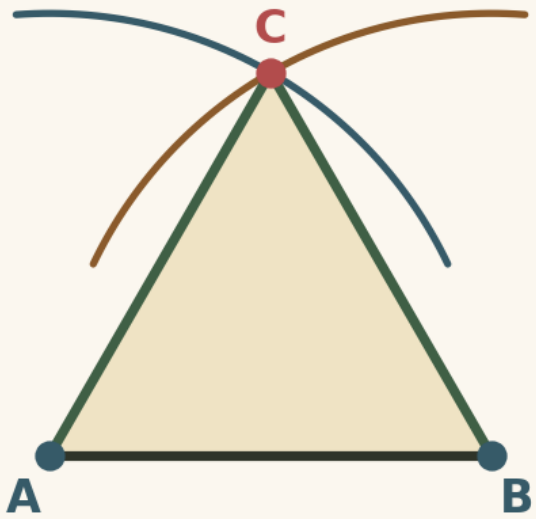
Work one step at a time and leave your construction marks showing — the arcs are the evidence that the result is exact. To construct an equilateral triangle on a side AB: open the compasses to the length AB; swing an arc from A; keep the same opening and swing an arc from B; mark the point C where the arcs cross; then join A to C and B to C. Every side is now equal to AB.

Worked examples

Two full examples to follow. Read them slowly — the aim is to see how each line follows from the one before, not to memorise a rule. It can help to cover the steps and predict the next line before you reveal it.

Example 1 — Constructing an equilateral triangle

Construct an equilateral triangle on the side AB, where AB = 6 cm. Leave the arcs showing.

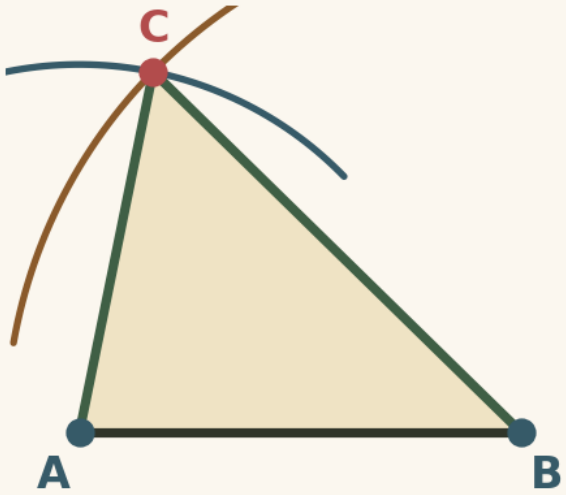


1. Open the compasses to the length of the base.	AB = 6 cm
2. Swing an arc from A, radius AB.	radius = 6 cm
3. Keep the same opening; swing an arc from B, radius AB.	radius = 6 cm
4. Mark C where the two arcs cross, then join A–C and B–C.	join A–C, B–C

Because both arcs have radius AB, CA = CB = AB = 6 cm — an exact equilateral triangle.

Example 2 — A triangle from three given sides (SSS)

Construct a triangle with sides 6 cm, 5 cm and 7 cm.



1. Draw the base AB = 6 cm (the longest chosen for the base here).	AB = 6 cm
2. Swing an arc from A, radius 5 cm.	radius = 5 cm
3. Swing an arc from B, radius 7 cm.	radius = 7 cm
4. Mark C where the arcs cross, then join A–C and B–C.	join A–C, B–C

The arcs cross at C, fixing a triangle with sides 6, 5 and 7 cm. (They only cross because each pair of sides is longer than the third — the triangle inequality.)

A gentle reminder

You can pause. You can return. You do not need to complete everything in one sitting.

If you get stuck

Getting stuck is part of doing mathematics, not a sign that something is wrong. There is support built into the lesson, and using it is a strong move:

- **Reconnection Routes** — if an earlier idea feels shaky (measuring a length, and what a triangle is), open a short recap and return whenever you are ready.
- **Socratic prompt** — a question to nudge your thinking.
- **Hint** — a little more help with the step in front of you.
- **Check** — try an answer and see how you are doing; a wrong try is useful information.
- **Worked solution** — a full model to compare your thinking against.

How the worked solution unlocks

The worked solution unlocks after you use the Socratic prompt, use the hint, and check two answers. Those steps are the learning — the worked solution is there to confirm your thinking, not to replace it.

Using support is part of learning. It is not cheating.

Recording your thinking

You can show your working in whatever way suits you today — the on-screen Scratchpad, paper, a spoken explanation, or a photo of a sketch. There is no single right format. If you do not finish everything in one sitting, that is completely fine: what you have done is information for your next step, never a failure.

Before you begin

Settle into a comfortable pace and take the steps one at a time. If your attention drifts, pause and come back — the lesson will keep your place. When you are ready, begin.

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