

CUT & GLUE SORT



CONSTRUCTIONS: COPYING A SEGMENT AND AN ANGLE

Compared With the Compass: What Do the Marks Prove?

Proved · shown false · no mark says either way

FREE

1 AB and CD are the same length.	2 AB and CD are the same length.	3 AB and CD are the same length.	4 Angle ABC and angle DEF are the same size.
--	--	--	--

1. **Hand out pages 3 and 4**, one of each per student, and scissors and glue. A compass each helps.
2. **Say this once:** *“An arc is evidence only if the page shows where its opening came from. Two things that look the same prove nothing.”*
3. **Every row gets 4.** A row with more or fewer has a piece in the wrong place. (This is on your page only, not the student's.)

Student sheets pages 3 and 4, one of each per student.

Answers page 5.

In the lesson, students copy segments and angles. Here they check copies someone else made. On every piece, somebody compared two segments or two angles with the compass instead of measuring them. The student decides what the marks prove. To compare two segments, you set the compass on the first one, so an arc passes through its far end. Then you carry that same opening to the second one. To compare two angles, you draw arcs with one opening at both vertices. Then you carry the distance between the two crossings from one angle to the other.

The third row is the hard one: the marks prove nothing either way. A segment pair can be drawn exactly equal, but with no arc on the first segment to show a compass setting. A ruler makes the same picture. A pair of angles can have arcs of one opening at both vertices, but the distance between the crossings was never carried across. On one pair of angles, the two arcs have *different* openings. Many students think the bigger arc means the bigger angle. In fact the two angles are equal, but nothing on the page compares them.

The middle row is not only for arcs that miss. On some of its pieces, the last arc lands exactly on the dot, but it was drawn with the wrong opening. On a segment, the compass was opened again between the two segments. On an angle, the last arc used the first opening instead of the distance between the crossings, and an angle copied that way always comes out at 60° . A student who simply trusts the drawing gets only eight of the twelve pieces right. A student who only checks where the last arc lands also gets eight.



This is the free lesson this activity came from. The worksheet, the full answers and the lesson plan are on it, at three levels of difficulty.

chooseyourlesson.com — 135 free geometry lessons.

What do the compass marks prove?

The arc is the evidence

Name _____

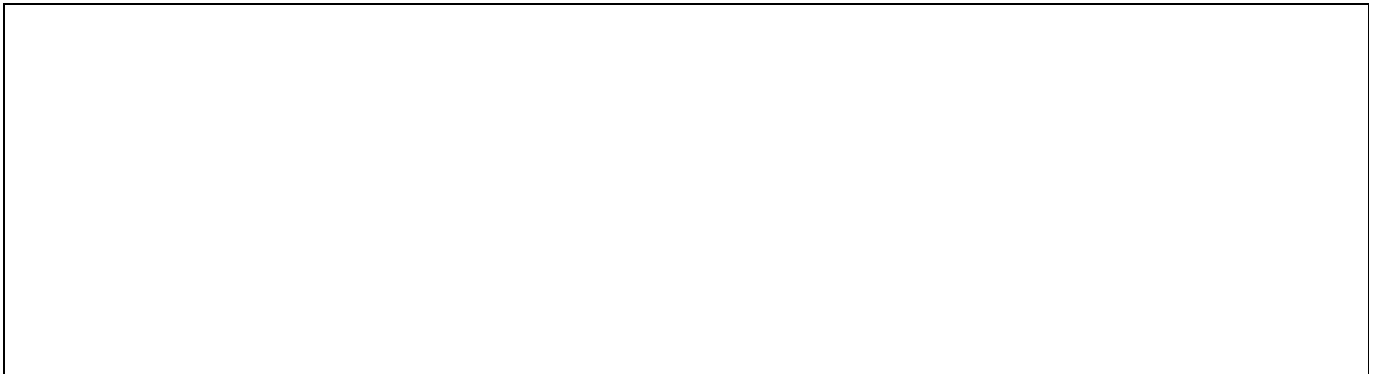
Period _____

Date _____

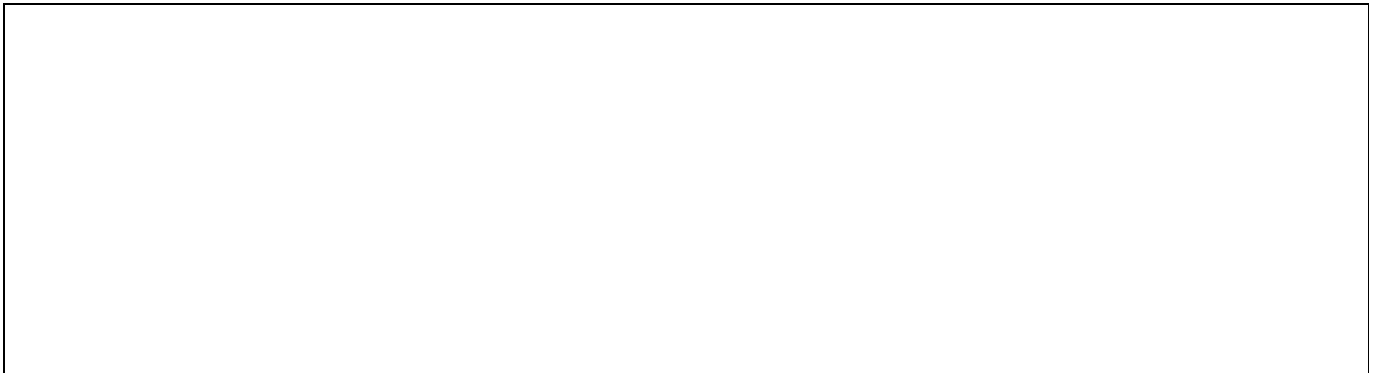
Cut out the twelve pieces on the next page. On each piece, somebody compared two segments or two angles with the compass. The marks were left on the page. Every point that was marked has a dot. Glue each piece into its row. **Marks on the page are proof. Two things that only *look* the same are not proof. Look for an arc drawn on the first figure, the same compass width used at both vertices, or the second arc carried across to the copy.**

Copy a segment. It has one setting. Use the setting from the given segment. Never reopen it. **Copy an angle. It has two settings.** First, choose any opening. Use it the same at the given angle and at the copy. Second, measure the distance between the two crossings on the given angle, then mark that same distance on the copy. **Last lesson:** any opening is legal. Nothing is ever measured.

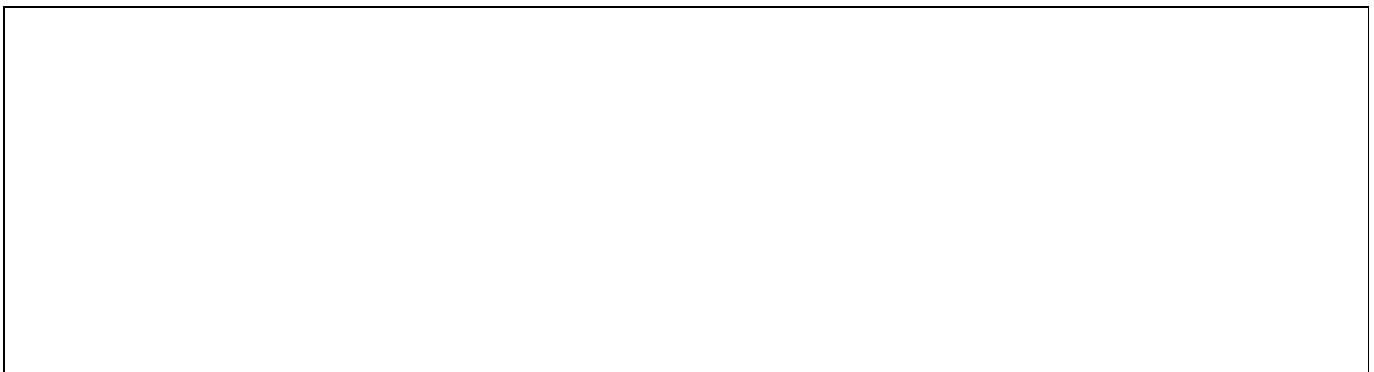
CORRECT: THE MARKS PROVE IT TRUE — *one setting was carried from the first to the second, and it fits*



WRONG: THE MARKS PROVE IT FALSE — *the marks show the two are not the same*

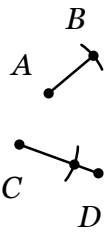
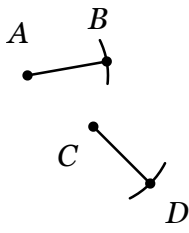
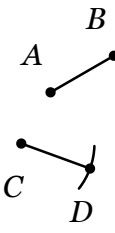
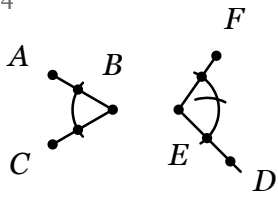
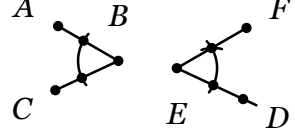
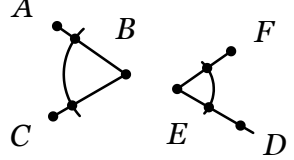
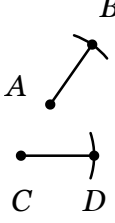
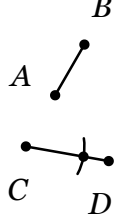
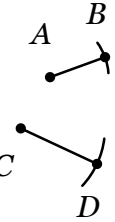
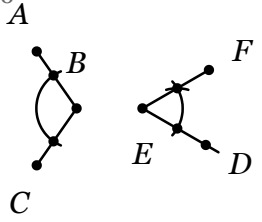
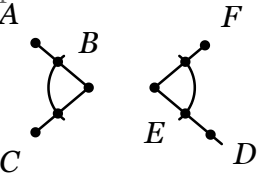
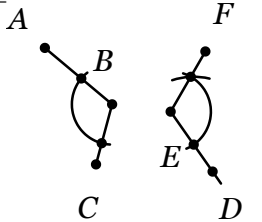


NO PROOF: NOTHING SAYS EITHER WAY — *it may look right, but nothing shows a setting was carried*



The twelve pieces

Cut along the dotted lines

1  AB and CD are the same length.	2  AB and CD are the same length.	3  AB and CD are the same length.	4  Angle ABC and angle DEF are the same size.
5  Angle ABC and angle DEF are the same size.	6  Angle ABC and angle DEF are the same size.	7  AB and CD are the same length.	8  AB and CD are the same length.
9  AB and CD are the same length.	10  Angle ABC and angle DEF are the same size.	11  Angle ABC and angle DEF are the same size.	12  Angle ABC and angle DEF are the same size.



135 free geometry lessons — worksheets, worked answers and lesson plans.
chooseyourlesson.com

Cut & Glue Sort — answers

For the teacher

CORRECT: THE MARKS PROVE IT TRUE	2 — An arc on AB shows the compass setting. The same setting, used from C, lands on D.	5 — Both vertices have arcs of one opening. The distance between the crossings, carried across, lands on the arm.	7 — An arc on AB shows the compass setting. The same setting, used from C, lands on D.	12 — Both vertices have arcs of one opening. The distance between the crossings, carried across, lands on the arm. The arms have different lengths.
WRONG: THE MARKS PROVE IT FALSE	1 — The setting from AB, used from C, crosses CD well before D.	4 — Both vertices have arcs of one opening. The distance between the crossings, carried across, misses the arm.	9 — The arc lands on D, but its opening is clearly not the setting on AB.	10 — The small arc lands on the arm, but it used the first opening, not the distance between the crossings.
NO PROOF: NOTHING SAYS EITHER WAY	3 — Drawn exactly equal, but no arc on AB shows a compass setting.	6 — The two arcs have different openings, so nothing is compared. The bigger arc does not mean the bigger angle.	8 — There is an arc at C, but nothing on AB shows where its opening came from.	11 — Both vertices have arcs of one opening, but the distance between the crossings was never carried across.

Every mark on every piece can really be made with a compass and a straightedge. No piece needs sharp eyes. Two arcs either have the same opening or differ by at least 3 mm. A dot is either on an arc or at least 2.5 mm away from it.