

CUT & GLUE SORT

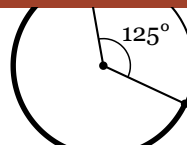
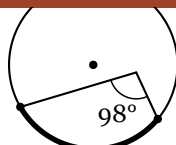
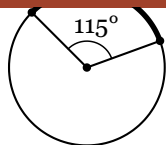


CENTRAL ANGLES AND ARC MEASURE

Central Angles and Arc Measure: Which Number?

Twelve circles · the angle, 360° minus it, or cannot tell · three rows

FREE



Row 1. The heavy arc measures the same as the marked angle.

Row 2. The heavy arc measures 360° minus the marked angle.

Row 3. Cannot tell. The marked angle is not a central angle. Its vertex is not the center.

Cut & Glue Sort — how to run it

25 minutes, including the cutting

1. **Hand out pages 3 and 4**, one of each per student, with scissors and glue. No calculator is needed.
2. **Say this once:** *“Do not find any number. First check: is the vertex of the angle at the center dot? If not, it is row 3. If it is, which arc is the angle over: the heavy arc, or the other one?”*
3. **Check a sheet in ten seconds:** every row gets four pieces.

Student sheets pages 3 and 4, one of each per student. Page 3 has the three rows. Page 4 has the pieces and a box with a minor arc, a major arc and a semicircle.

Answers page 5.

Each piece is a circle with its center dotted, one arc drawn heavy, and one angle marked. The measure of an arc is defined by its central angle, the angle whose vertex is the center. If the central angle is over the heavy arc, the heavy arc measures the same as the angle. If the central angle is over the other arc, the heavy arc measures 360° minus the angle.

The angle mark says which of the two angles at the center is meant. In rows 1 and 2, four pieces have the mark drawn the long way round, so the angle is more than 180° . A student who always takes the smaller angle puts these in the wrong row.

Row 3 is where the definition says nothing. On its four pieces the angle looks like the others, and the heavy arc lies inside it. But its vertex is not the center dot, so it is not a central angle, and its number is not the measure of the arc. Guessing does not work: a simple guessing rule, such as “a number over 180° goes in row 2,” places at most five pieces correctly.



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.
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Cut & Glue Sort — which number?

Central angles and arc measure

Name _____

Period _____

Date _____

Each piece on the next page is a circle with one heavy arc and one marked angle. Do not find any number. **Look at where the vertex of the angle is, and which arc the angle is over. Glue the piece in its row.**

Row 1. The heavy arc measures the same as the marked angle.

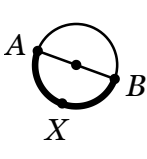
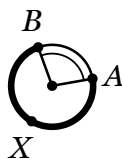
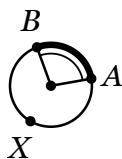
Row 2. The heavy arc measures 360° minus the marked angle.

Row 3. Cannot tell. The marked angle is not a central angle. Its vertex is not the center.

Cut & Glue Sort — the pieces

Cut along the dashed lines

Cut out the twelve pieces. Glue each one in its row on the other sheet. The dot in the middle of each circle is its center. A small arc at a vertex shows which angle is marked.

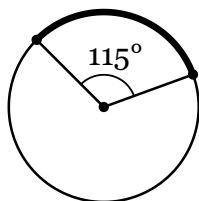


A central angle has its vertex at the center.

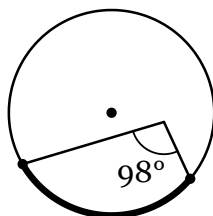
A minor arc measures the same as its central angle. A major arc measures 360° minus the minor arc.

minor arc $AB = 100^\circ$ major arc $AXB = 260^\circ$ semicircle $AXB = 180^\circ$

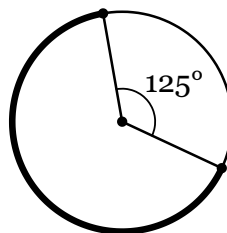
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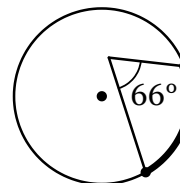
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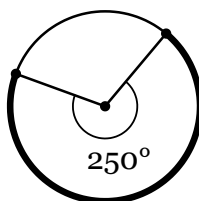
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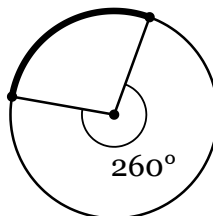
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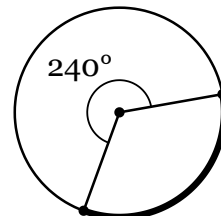
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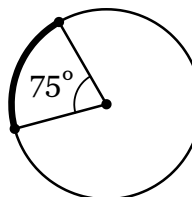
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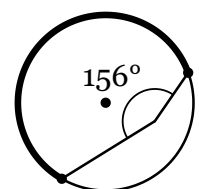
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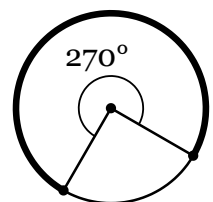
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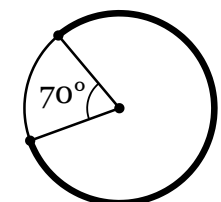
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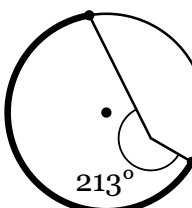
10



11



12



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Each row holds four pieces. Every piece is listed by the number printed on its corner, with the reason. The students do not find the measures; they are given here so you can explain a piece.

1 The heavy arc measures the same as the marked angle.

- 1.** A heavy minor arc. The angle at the center marked 115° is over the heavy arc. *Why:* The vertex is the center, and the heavy arc lies inside the marked angle. The heavy arc measures 115° .
- 5.** A heavy major arc. The angle at the center marked 250° is over the heavy arc, drawn the long way round. *Why:* The vertex is the center, and the angle mark goes the long way round, over the heavy arc. The heavy arc is a major arc of 250° .
- 8.** A heavy minor arc. The angle at the center marked 75° is over the heavy arc. *Why:* The vertex is the center, and the heavy arc lies inside the marked angle. The heavy arc measures 75° .
- 10.** A heavy major arc. The angle at the center marked 270° is over the heavy arc, drawn the long way round. *Why:* The vertex is the center, and the angle mark goes the long way round, over the heavy arc. The heavy arc is a major arc of 270° .

2 The heavy arc measures 360° minus the marked angle.

- 3.** A heavy major arc. The angle at the center marked 125° is over the other arc. *Why:* The vertex is the center, but the marked angle is over the other arc. The heavy arc is the major arc: $360^\circ - 125^\circ = 235^\circ$.
- 6.** A heavy minor arc. The angle at the center marked 260° is over the other arc, drawn the long way round. *Why:* The vertex is the center, but the angle mark goes the long way round, over the other arc. The heavy arc is the minor arc: $360^\circ - 260^\circ = 100^\circ$.
- 7.** A heavy minor arc. The angle at the center marked 240° is over the other arc, drawn the long way round. *Why:* The vertex is the center, but the angle mark goes the long way round, over the other arc. The heavy arc is the minor arc: $360^\circ - 240^\circ = 120^\circ$.
- 11.** A heavy major arc. The angle at the center marked 70° is over the other arc. *Why:* The vertex is the center, but the marked angle is over the other arc. The heavy arc is the major arc: $360^\circ - 70^\circ = 290^\circ$.

3 Cannot tell. The marked angle is not a central angle. Its vertex is not the center.

- 2.** A heavy minor arc. A 98° angle over it has its vertex inside the circle, away from the center. *Why:* The two segments meet at a point that is not the center dot, so the 98° angle is not a central angle. It does not give the measure of the heavy arc. (As drawn, the heavy arc is about 110° , but nothing on the piece says so.)
- 4.** A heavy minor arc. A 66° angle over it has its vertex inside the circle, away from the center. *Why:* The two segments meet at a point that is not the center dot, so the 66° angle is not a central angle. It does not give the measure of the heavy arc. (As drawn, the heavy arc is about 80° , but nothing on the piece says so.)
- 9.** A heavy major arc. A 156° angle over it has its vertex inside the circle, away from the center. *Why:* The two segments meet at a point that is not the center dot, so the 156° angle is not a central angle. It does not give the measure of the heavy arc. (As drawn, the heavy arc is about 220° , but nothing on the piece says so.)
- 12.** A heavy major arc. A 213° angle over it, drawn the long way round, has its vertex inside the circle, away from the center. *Why:* The two segments meet at a point that is not the center dot, so the 213° angle is not a central angle. It does not give the measure of the heavy arc. (As drawn, the heavy arc is about 230° , but nothing on the piece says so.)

To check a piece with a student, ask: “Put a finger on the vertex of the angle. Is it on the center dot? Now follow the small arc of the angle mark. Is it on the same side as the heavy arc?”