

ANSWER MAZE

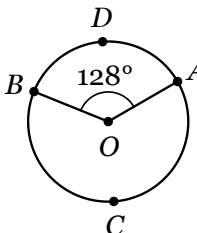


CENTRAL ANGLES AND ARC MEASURE

Central Angles and Arc Measure: Which Arc?

Minor arcs, major arcs and semicircles · one page · 10–15 minutes · nothing to prepare

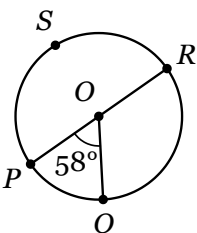
FREE



5 Find the measure of arc ACB.

$128^\circ \rightarrow$ go to box 3
 $232^\circ \rightarrow$ go to box 2

Hint: Read the name of the arc. Find its middle letter on the circle.



2 Find the measure of arc QR.

PR is a diameter.
 $122^\circ \rightarrow$ go to box 7
 $302^\circ \rightarrow$ go to box 6

Hint: Find the line through O. Each half of the circle is a semicircle.

1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“Start at box 5. Read the name of the arc first. Two letters mean the minor arc. Three letters mean the long way, through the middle letter. Write every box number in the row at the bottom as you go.”*
3. **Check a sheet quickly.** A student with no mistakes writes **5 2 7 4 1 8**: six boxes, then out.

Student sheet page 3, one per student, and scrap paper for working.
Answers page 4.

Every box shows a circle with its center O, four lettered points, and one or two angles at O with their degrees. The box asks for one arc by its name, and the answer is a whole number of degrees. This sheet names arcs this way: two letters name the minor arc, and three letters, with a point of the arc in the middle, name a major arc or a semicircle. Some textbooks use other definitions, so tell the class which ones this sheet uses.

Every wrong answer comes from one of two mistakes. In the first, the student reads the name the wrong way: for example, the student gives the angle that is drawn when three letters ask for the major arc. These wrong answers send the student to box 3. In the second, the box has a diameter, and the student uses 360° where the diameter makes two halves of 180° . These wrong answers send the student to box 6. Boxes 3 and 6 ask the same kind of question again, and both of their answers lead back to the route.

The row at the bottom is the check. A clean run is six numbers. Each wrong answer adds at least one more. Guessing does not get a student out: every simple guessing rule, such as always taking the smaller number, goes wrong within the first two boxes.



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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Answer Maze — which arc?

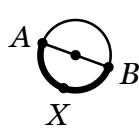
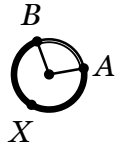
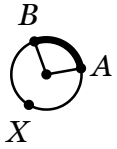
Start at box 5

Name _____

Period _____

Date _____

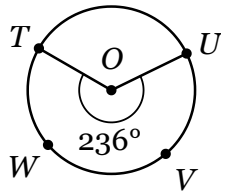
Find the measure of each arc in whole degrees. Pick an answer and go to the box it names. Write each box number in the row at the bottom.



Two letters name the minor arc. Three letters name a major arc or a semicircle.
A minor arc measures the same as its central angle. A major arc is 360° minus the minor arc.

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

semicircle $AXB = 180^\circ$

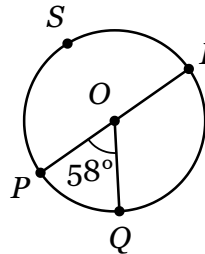


1 Find the measure of arc TU.

$124^\circ \rightarrow$ go to box 8

$236^\circ \rightarrow$ go to box 3

Hint: Look at the angle mark at O. Which way round does it go?



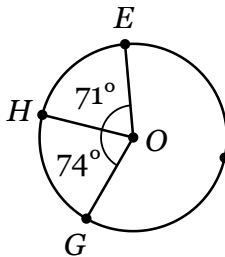
2 Find the measure of arc QR.

PR is a diameter.

$122^\circ \rightarrow$ go to box 7

$302^\circ \rightarrow$ go to box 6

Hint: Find the line through O. Each half of the circle is a semicircle.

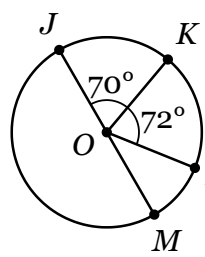


3 Find the measure of arc GE.

$215^\circ \rightarrow$ go to box 5

$145^\circ \rightarrow$ go to box 2

Hint: Two letters name the short way round. Which angles at O lie along it?



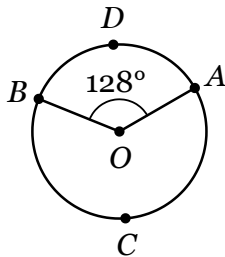
4 Find the measure of arc LM.

JM is a diameter.

$218^\circ \rightarrow$ go to box 6

$38^\circ \rightarrow$ go to box 1

Hint: Two angles lie on one side of the diameter. What does that half measure?

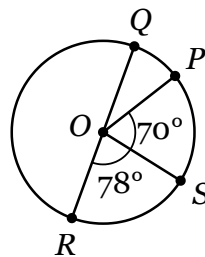


5 Find the measure of arc ACB.

$128^\circ \rightarrow$ go to box 3

$232^\circ \rightarrow$ go to box 2

Hint: Read the name of the arc. Find its middle letter on the circle.



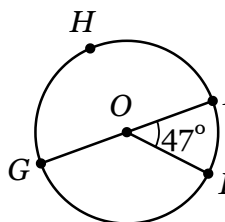
6 Find the measure of arc PQ.

RQ is a diameter.

$32^\circ \rightarrow$ go to box 7

$212^\circ \rightarrow$ go to box 2

Hint: Find the diameter. Which half of the circle holds both marked angles?



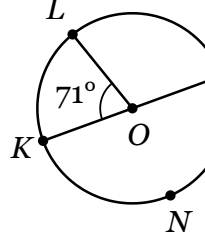
7 Find the measure of arc FHG.

EG is a diameter.

$227^\circ \rightarrow$ go to box 4

$133^\circ \rightarrow$ go to box 3

Hint: Trace the arc from its first letter, through the middle letter, to the end.



8 Find the measure of arc LM.

KM is a diameter.

$289^\circ \rightarrow$ go to box 6

$109^\circ \rightarrow$ you are out

Hint: A straight line through O makes a straight angle. Which arcs lie along it?

Write every box number here, in order.

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The route, in order. Boxes 3 and 6 are not on it. A student reaches them only by a wrong answer. They are the last two rows of the table. This sheet names arcs this way: two letters for the minor arc, three letters for a major arc or a semicircle. Some textbooks use other definitions, so tell the class which ones this sheet uses.

5 → 2 → 7 → 4 → 1 → 8 → out

	The box's question	Right answer, and why	Wrong answer, and why a student picks it
1	Box 5 Angle AOB = 128° . Find the measure of arc ACB.	232° . Arc ACB has three letters, so it is the major arc from A to B through C. The minor arc AB = 128° , so arc ACB = $360^\circ - 128^\circ = 232^\circ$.	" 128° " goes to box 3. 128° is the minor arc AB, the angle that is drawn. The name has three letters, so it asks for the other arc.
2	Box 2 Angle POQ = 58° . PR is a diameter. Find the measure of arc QR.	122° . PR is a diameter, so each half of the circle measures 180° . Arc QR = $180^\circ - 58^\circ = 122^\circ$.	" 302° " goes to box 6. $302^\circ = 360^\circ - 58^\circ$ uses the whole circle. Arc QR is on one half of the diameter, and that half measures 180° .
3	Box 7 Angle FOE = 47° . EG is a diameter. Find the measure of arc FHG.	227° . EG is a diameter. Arc FHG runs from F past E and through H to G: $47^\circ + 180^\circ = 227^\circ$.	" 133° " goes to box 3. $133^\circ = 180^\circ - 47^\circ$ is arc FG, the short way. The middle letter H says the arc goes the long way.
4	Box 4 Angle KOJ = 70° and angle LOK = 72° . JM is a diameter. Find the measure of arc LM.	38° . JM is a diameter, so the half from J to M through K and L measures 180° . Arc LM = $180^\circ - 70^\circ - 72^\circ = 38^\circ$.	" 218° " goes to box 6. $218^\circ = 360^\circ - 70^\circ - 72^\circ$ uses the whole circle. The two angles and arc LM fill one half, which measures 180° .
5	Box 1 Angle TOU = 236° (marked the long way round). Find the measure of arc TU.	124° . The angle mark at O goes the long way round, so 236° is the major arc. Arc TU has two letters, so it is the minor arc: $360^\circ - 236^\circ = 124^\circ$.	" 236° " goes to box 3. 236° is the major arc, the one the mark covers. Two letters name the minor arc.
6	Box 8 Angle LOK = 71° . KM is a diameter. Find the measure of arc LM.	109° . KM is a diameter, so each half of the circle measures 180° . Arc LM = $180^\circ - 71^\circ = 109^\circ$.	" 289° " goes to box 6. $289^\circ = 360^\circ - 71^\circ$ uses the whole circle. Arc LM is on one half of the diameter, and that half measures 180° .
	Box 3 Angle HOG = 74° and angle EOH = 71° . Find the measure of arc GE.	145° . Arc GE has two letters, so it is the minor arc from G to E, which passes H. Arc addition: $74^\circ + 71^\circ = 145^\circ$.	" 215° " goes to box 5. $215^\circ = 360^\circ - 145^\circ$ is the long way round from G to E. Two letters name the minor arc.
	Box 6 Angle ROS = 78° and angle SOP = 70° . RQ is a diameter. Find the measure of arc PQ.	32° . RQ is a diameter, so the half from R to Q through S and P measures 180° . Arc PQ = $180^\circ - 78^\circ - 70^\circ = 32^\circ$.	" 212° " goes to box 2. $212^\circ = 360^\circ - 78^\circ - 70^\circ$ uses the whole circle. The two angles and arc PQ fill one half, which measures 180° .

How to check any box. Read the name. Two letters: the minor arc, which measures the same as its central angle. Three letters: the arc from the first letter through the middle letter to the third. A major arc measures 360° minus the minor arc with the same ends. A diameter cuts the circle into two halves of 180° each.

A student can find the last four boxes of the route by following the arrows backward from "you are out." So ask a student with a clean row to explain one box.