

ANSWER MAZE

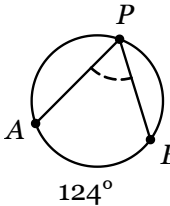


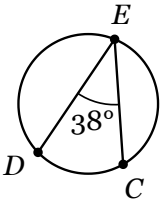
INSCRIBED ANGLES

Inscribed Angles: Half the Arc

Halve or double? · one page · 10–15 minutes · nothing to prepare

FREE

**4** Find $m\angle APB$.
 $124^\circ \rightarrow$ go to box 3
 $62^\circ \rightarrow$ go to box 7
Hint: Find the vertex on the circle. Look at the arc between its two sides.

**7** Find arc CD .
 $76^\circ \rightarrow$ go to box 2
 $19^\circ \rightarrow$ go to box 6
Hint: Look at the arc inside the angle. Which comes out greater, the arc or the angle?

1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“Start at box 4. An inscribed angle is half of the arc inside it. So the arc is twice the angle. Before you pick, say which one is bigger. Write every box number in the row at the bottom as you go.”*
3. **Check a sheet quickly.** A student with no mistakes writes **4 7 2 5 8 1**: six boxes, then out.

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

Every box shows one circle with an inscribed angle. Its vertex is on the circle, and the arc inside the angle does not pass through the vertex. Some boxes print that arc and ask for the angle, which is half the arc. The others print the angle and ask for the arc, which is twice the angle.

This sheet calls an angle inscribed when its vertex is on the circle and each side meets the circle again. The arc it intercepts is the arc inside the angle. Arc AB , with two letters, is the short arc. 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 copies the arc as the angle, as if the vertex were at the center. These wrong answers send the student to box 3. In the second, the student halves the angle when the box asks for the arc. 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 larger 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 — inscribed angles

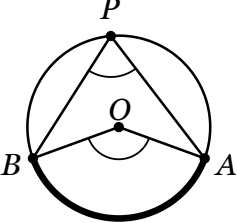
Start at box 4

Name _____

Period _____

Date _____

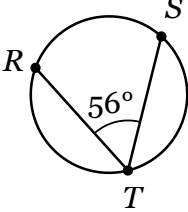
Start at box 4. Find what the box asks for, in whole degrees, like 37° . Pick that answer and go to the box it names. Write each box number in the row at the bottom as you go.



Inscribed angle $\angle APB$: its vertex P is on the circle. **Central angle** $\angle AOB$: its vertex is the center O .

The intercepted arc (thick) is the arc inside the angle. It is the arc that does **not** pass through the vertex.

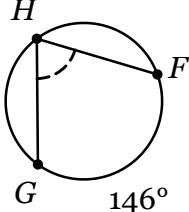
An inscribed angle is half of its intercepted arc. The arc is twice the angle. $\angle AOB$ equals arc AB .



1 Find arc RS.

$112^\circ \rightarrow$ you are out
 $28^\circ \rightarrow$ go to box 6

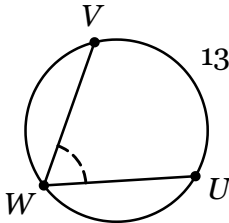
Hint: Check which of the two the box asks for: the arc or the angle.



2 Find $m\angle FHG$.

$73^\circ \rightarrow$ go to box 5
 $146^\circ \rightarrow$ go to box 3

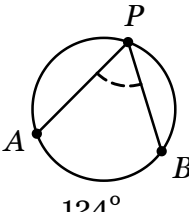
Hint: Check where the vertex is: at the center, or on the circle?



3 Find $m\angle UWV$.

$67^\circ \rightarrow$ go to box 7
 $134^\circ \rightarrow$ go to box 4

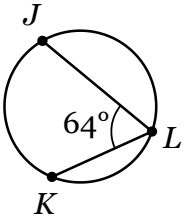
Hint: Find the vertex. It stands on the circle, away from the center.



4 Find $m\angle APB$.

$124^\circ \rightarrow$ go to box 3
 $62^\circ \rightarrow$ go to box 7

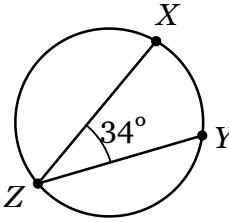
Hint: Find the vertex on the circle. Look at the arc between its two sides.



5 Find arc JK.

$32^\circ \rightarrow$ go to box 6
 $128^\circ \rightarrow$ go to box 8

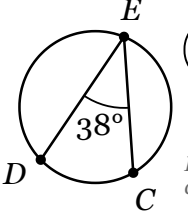
Hint: Read the question. Does it ask for an angle or for an arc?



6 Find arc XY.

$17^\circ \rightarrow$ go to box 7
 $68^\circ \rightarrow$ go to box 2

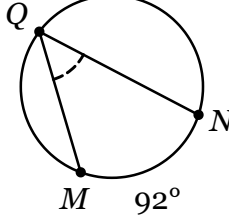
Hint: The arc is the answer here. Which one is greater: the arc or its angle?



7 Find arc CD.

$76^\circ \rightarrow$ go to box 2
 $19^\circ \rightarrow$ go to box 6

Hint: Look at the arc inside the angle. Which comes out greater, the arc or the angle?



8 Find $m\angle MQN$.

$92^\circ \rightarrow$ go to box 3
 $46^\circ \rightarrow$ go to box 1

Hint: Compare the printed arc with the angle at the circle. Which one is greater?

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.

4 → 7 → 2 → 5 → 8 → 1 → out

	The box's question	Right answer, and why	Wrong answer, and why a student picks it
1	Box 4 Arc $AB = 124^\circ$. P is on the long arc. Find $m\angle APB$.	62° . Arc AB is the arc inside $\angle APB$; it does not pass through P . An inscribed angle is half its arc: $124^\circ \div 2 = 62^\circ$.	"124°" goes to box 3. The student copied the arc as the angle. The vertex is on the circle, not at the center, so the angle is half the arc.
2	Box 7 $\angle CED = 38^\circ$. E is on the long arc. Find arc CD .	76° . Arc CD is the arc inside $\angle CED$. The arc is twice its inscribed angle: $2 \times 38^\circ = 76^\circ$.	"19°" goes to box 6. The student halved the angle. The arc is bigger than its inscribed angle, so the angle is doubled.
3	Box 2 Arc $FG = 146^\circ$. H is on the long arc. Find $m\angle FHG$.	73° . Arc FG is the arc inside $\angle FHG$; it does not pass through H . An inscribed angle is half its arc: $146^\circ \div 2 = 73^\circ$.	"146°" goes to box 3. The student copied the arc as the angle. The vertex is on the circle, not at the center, so the angle is half the arc.
4	Box 5 $\angle JLK = 64^\circ$. L is on the long arc. Find arc JK .	128° . Arc JK is the arc inside $\angle JLK$. The arc is twice its inscribed angle: $2 \times 64^\circ = 128^\circ$.	"32°" goes to box 6. The student halved the angle. The arc is bigger than its inscribed angle, so the angle is doubled.
5	Box 8 Arc $MN = 92^\circ$. Q is on the long arc. Find $m\angle MQN$.	46° . Arc MN is the arc inside $\angle MQN$; it does not pass through Q . An inscribed angle is half its arc: $92^\circ \div 2 = 46^\circ$.	"92°" goes to box 3. The student copied the arc as the angle. The vertex is on the circle, not at the center, so the angle is half the arc.
6	Box 1 $\angle RTS = 56^\circ$. T is on the long arc. Find arc RS .	112° . Arc RS is the arc inside $\angle RTS$. The arc is twice its inscribed angle: $2 \times 56^\circ = 112^\circ$.	"28°" goes to box 6. The student halved the angle. The arc is bigger than its inscribed angle, so the angle is doubled.
	Box 3 Arc $UV = 134^\circ$. W is on the long arc. Find $m\angle UWV$.	67° . Arc UV is the arc inside $\angle UWV$; it does not pass through W . An inscribed angle is half its arc: $134^\circ \div 2 = 67^\circ$.	"134°" goes to box 4. The student copied the arc as the angle. The vertex is on the circle, not at the center, so the angle is half the arc.
	Box 6 $\angle XZY = 34^\circ$. Z is on the long arc. Find arc XY .	68° . Arc XY is the arc inside $\angle XZY$. The arc is twice its inscribed angle: $2 \times 34^\circ = 68^\circ$.	"17°" goes to box 7. The student halved the angle. The arc is bigger than its inscribed angle, so the angle is doubled.

How to check any box. Find the vertex of the angle. It is on the circle. The arc inside the angle is the one that does not pass through the vertex. The angle is half of that arc, and the arc is twice the angle. A student who says first which one is bigger catches both mistakes.

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.