

ANSWER MAZE

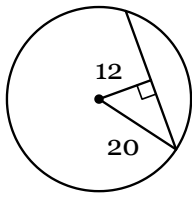
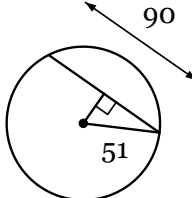


PERPENDICULAR BISECTORS OF CHORDS

Perpendicular Bisectors of Chords

Radius, half the chord, distance from the center · one page · 10–15 minutes · nothing to prepare

FREE

 5 Find the length of the chord. 16 → go to box 3 32 → go to box 2 <i>Hint: Look at the question. Which segment does it ask for, from end to end?</i>	 2 Find the distance from the center to the chord. 24 → go to box 7 51 → go to box 6 <i>Hint: Find the segment with the small square. Where does it start and stop?</i>
--	---

1. **Hand out page 3**, one per student, and a calculator if you can. Nothing else is needed.
2. **Say this once:** *“Start at box 5. The segment with the small square goes from the center to the middle of the chord. The radius is the longest side of the right triangle. 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 one circle with its center, a chord, the segment from the center that meets the chord at a right angle, and a radius to one end of the chord. The radius, half of the chord and that segment make a right triangle, and the radius is its longest side. Some boxes ask for the chord or the diameter. Others ask for the distance from the center to the chord. Every answer is a whole number.

This sheet calls the length of the segment from the center that is perpendicular to the chord “the distance from the center to the chord.” 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 gives half of what the box asks for: half of the chord instead of the chord, or the radius instead of the diameter. These wrong answers send the student to box 3. In the second, the box asks for the distance from the center to the chord and the student gives the radius, which runs to an end of the chord. 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.
chooseyourlesson.com — 135 free geometry lessons.

Answer Maze — chords and their distances

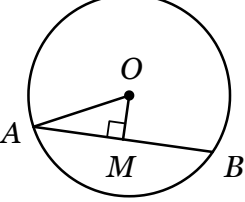
Start at box 5

Name _____

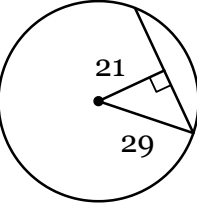
Period _____

Date _____

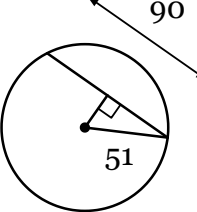
Start at box 5. The dot is the center. Find what the box asks for. Every answer is a whole number. Pick that answer and go to the box it names. Write each box number in the row at the bottom as you go.



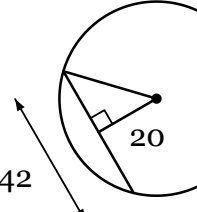
O is the center. The small square shows that OM is perpendicular to the chord AB . So OM is the **distance** from O to the chord, and M is the middle of AB .
 OA is a **radius**. It is the longest side of the right triangle OAM . AM is **half** of the chord.
radius² = (half the chord)² + distance². The chord is $2 \times AM$. The diameter is $2 \times$ the radius.
 An arrow at each end of a number means it is the whole chord.



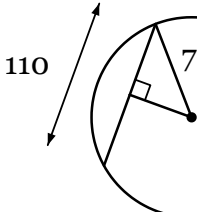
1 Find the length of the chord.
 20 → go to box 3
 40 → go to box 8
Hint: Put a finger on each end of the chord. Which number reaches across it?



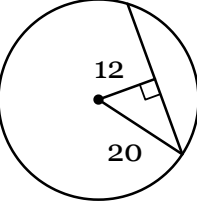
2 Find the distance from the center to the chord.
 24 → go to box 7
 51 → go to box 6
Hint: Find the segment with the small square. Where does it start and stop?



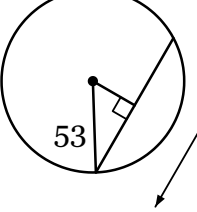
3 Find the diameter of the circle.
 58 → go to box 2
 29 → go to box 5
Hint: The triangle gives the radius. Read what the question asks for.



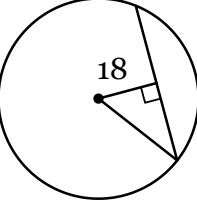
4 Find the distance from the center to the chord.
 73 → go to box 6
 48 → go to box 1
Hint: Look at where each segment from the center ends. Which one meets the chord at the square?



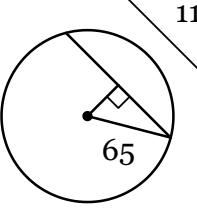
5 Find the length of the chord.
 16 → go to box 3
 32 → go to box 2
Hint: Look at the question. Which segment does it ask for, from end to end?



6 Find the distance from the center to the chord.
 53 → go to box 2
 28 → go to box 7
Hint: A radius ends on the circle. Where does the distance end?



7 Find the diameter of the circle.
 60 → go to box 4
 30 → go to box 3
Hint: Read the question again. Does it ask for the radius or the diameter?



8 Find the distance from the center to the chord.
 33 → you are out
 65 → go to box 6
Hint: Read how the box at the top of the sheet says the distance is measured.

Write every box number here, in order.

--	--	--	--	--	--	--	--	--	--



chooseyourlesson.com
 135 free geometry lessons

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.

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 The radius is 20 and the distance from the center to the chord is 12. Find the length of the chord.	32. The radius 20 is the longest side of the right triangle. Half of the chord is $\sqrt{20^2 - 12^2} = \sqrt{256} = 16$. The chord is twice that: 32.	"16" goes to box 3. 16 is half of the chord, the side of the triangle. The chord runs from one end to the other, so it is twice that.
2	Box 2 The radius is 51 and the whole chord is 90 (arrows at both ends). Find the distance from the center to the chord.	24. The distance is the segment from the center that meets the chord at the square. Half of the chord is $90 \div 2 = 45$, so the distance is $\sqrt{51^2 - 45^2} = \sqrt{576} = 24$.	"51" goes to box 6. 51 is the radius, which runs from the center to an end of the chord. The distance is measured along the segment that meets the chord at a right angle.
3	Box 7 The whole chord is 48 (arrows at both ends) and the distance is 18. Find the diameter of the circle.	60. Half of the chord is $48 \div 2 = 24$. The radius is $\sqrt{24^2 + 18^2} = \sqrt{900} = 30$. The diameter is twice the radius: 60.	"30" goes to box 3. 30 is the radius, the longest side of the triangle. The question asks for the diameter, which is twice that.
4	Box 4 The radius is 73 and the whole chord is 110 (arrows at both ends). Find the distance from the center to the chord.	48. The distance is the segment from the center that meets the chord at the square. Half of the chord is $110 \div 2 = 55$, so the distance is $\sqrt{73^2 - 55^2} = \sqrt{2304} = 48$.	"73" goes to box 6. 73 is the radius, which runs from the center to an end of the chord. The distance is measured along the segment that meets the chord at a right angle.
5	Box 1 The radius is 29 and the distance from the center to the chord is 21. Find the length of the chord.	40. The radius 29 is the longest side of the right triangle. Half of the chord is $\sqrt{29^2 - 21^2} = \sqrt{400} = 20$. The chord is twice that: 40.	"20" goes to box 3. 20 is half of the chord, the side of the triangle. The chord runs from one end to the other, so it is twice that.
6	Box 8 The radius is 65 and the whole chord is 112 (arrows at both ends). Find the distance from the center to the chord.	33. The distance is the segment from the center that meets the chord at the square. Half of the chord is $112 \div 2 = 56$, so the distance is $\sqrt{65^2 - 56^2} = \sqrt{1089} = 33$.	"65" goes to box 6. 65 is the radius, which runs from the center to an end of the chord. The distance is measured along the segment that meets the chord at a right angle.
	Box 3 The whole chord is 42 (arrows at both ends) and the distance is 20. Find the diameter of the circle.	58. Half of the chord is $42 \div 2 = 21$. The radius is $\sqrt{21^2 + 20^2} = \sqrt{841} = 29$. The diameter is twice the radius: 58.	"29" goes to box 5. 29 is the radius, the longest side of the triangle. The question asks for the diameter, which is twice that.
	Box 6 The radius is 53 and the whole chord is 90 (arrows at both ends). Find the distance from the center to the chord.	28. The distance is the segment from the center that meets the chord at the square. Half of the chord is $90 \div 2 = 45$, so the distance is $\sqrt{53^2 - 45^2} = \sqrt{784} = 28$.	"53" goes to box 2. 53 is the radius, which runs from the center to an end of the chord. The distance is measured along the segment that meets the chord at a right angle.

How to check any box. Find the right triangle: the radius, half of the chord, and the segment from the center with the square. The radius is the longest side, so $\text{radius}^2 = (\text{half the chord})^2 + \text{distance}^2$. Halve a whole chord before using it, and double half the chord or the radius when the box asks for the chord or the diameter.

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.