

SCAVENGER HUNT



ARCS AND CHORDS

Congruent Chords, Congruent Arcs

Two equal chords share the rest of the circle · the cards check the answers

FREE

ANSWER

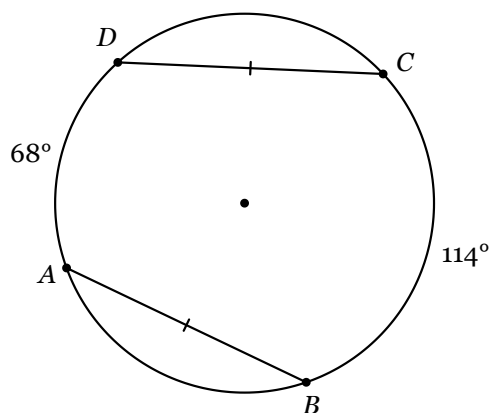
259°

Chords with one tick mark are congruent.

Find arc AB .

Write it in degrees, like 145° .

Two congruent chords cut two arcs of the same size. Share the rest of the circle between them.



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M

1. **Tape the 16 cards around the room**, in any order. Each card has a large letter in its bottom left corner. Start each group at a *different* one of these eight cards: *M D F K H P J Q*.
2. **Say this once:** “Chords with tick marks are congruent, so their arcs have the same measure. The four arcs around a circle add to 360° . Two letters mean the short way. Three letters mean the long way. Write your answer in degrees, like 145° . Then walk to the card with that answer at the top.”
3. **Each group writes one line per card.** Eight right answers bring the group back to its first card.

16 cards	pages 3–10, one copy. There are two cards on each sheet. Cut the whole stack once.
Record sheet	page 11, one per student. It shows how the arcs are named, on a labeled circle.
Answers	pages 12–13, for you only. Do not put them up in the room.

Every card shows one circle with four points in order. The two chords with tick marks are congruent, so their two arcs have the same measure and share what is left of 360° . Four ring cards ask for that short arc. The others ask for the long way around, which is 360° minus the short arc.

This sheet names an arc by its two endpoints when it is the short way around (a minor arc), and by three letters when it is the long way around (a major arc). Arc *ACB* goes from *A* to *B* through *C*. Two arcs are congruent when they have the same measure and lie in the same circle or in congruent circles. Some textbooks use other definitions, so tell the class which ones this sheet uses.

Eight of the sixteen cards make the ring. A group reaches the other eight only by a wrong answer, but all the cards look the same. Two mistakes lead there: giving the two congruent arcs together instead of sharing, and giving the short arc when three letters ask for the long one. That card sends the group back to the card it got wrong.

The check is the length of the group’s list. A clean run is **eight lines**. Each wrong answer adds two. Every card has a line in italics under the boxed rule. It tells a group that arrived by a wrong answer what to check. Guessing does not work: no single rule, such as always taking 360° minus the two numbers, gets more than eight of the cards. If a group is stuck, ask: “Which two chords have tick marks? Do the four arcs add to 360° ?”



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

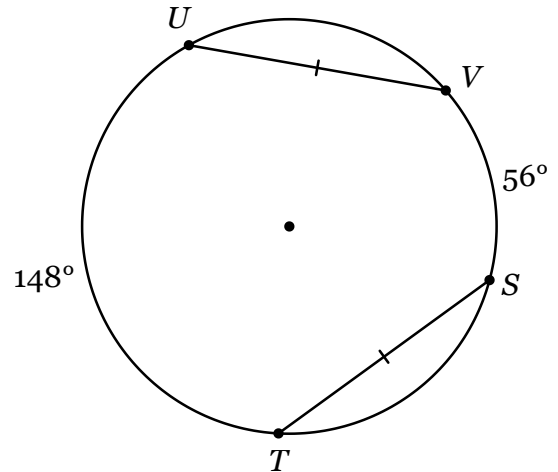
101°

Chords with one tick mark are congruent.

Find arc UV .

Write it in degrees, like 145°.

The short way plus the long way make the whole circle, 360°.



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A

ANSWER

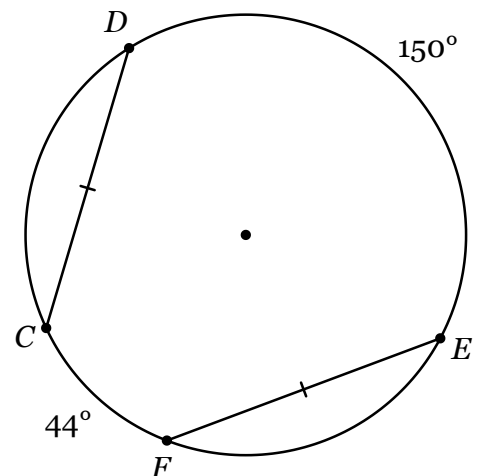
224°

Chords with one tick mark are congruent.

Find arc ECF .

Write it in degrees, like 145°.

Check the sum of all four arcs. It must be 360°.



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B

ANSWER

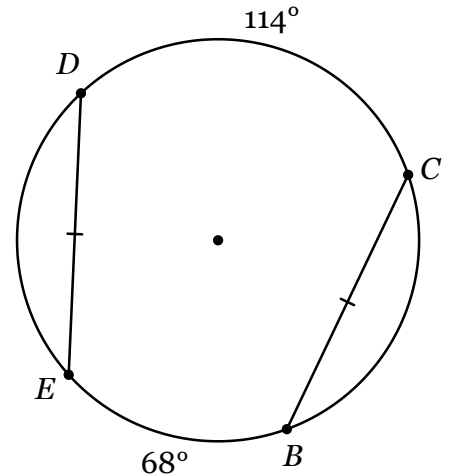
127°

Chords with one tick mark are congruent.

Find arc DE .

Write it in degrees, like 145°.

The middle letter tells which way around the arc goes. Which way is it?



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C

ANSWER

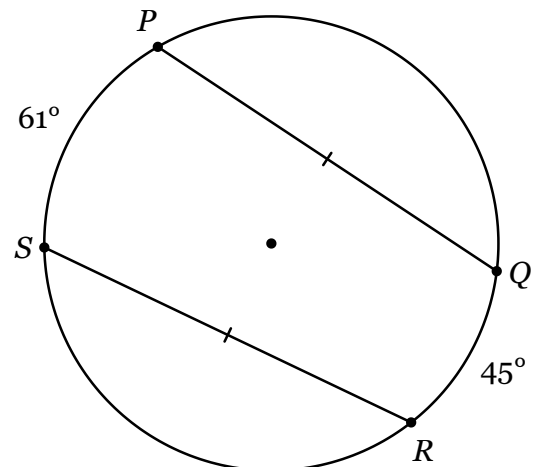
89°

Chords with one tick mark are congruent.

Find arc RPS .

Write it in degrees, like 145°.

Three letters name the long way around. Two letters name the short way.



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D

ANSWER

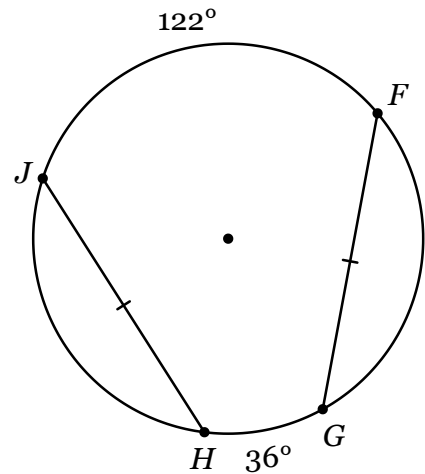
178°

Chords with one tick mark are congruent.

Find arc FHG .

Write it in degrees, like 145°.

What is left of 360° belongs to two arcs. Is your arc one of them, or both?



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E

ANSWER

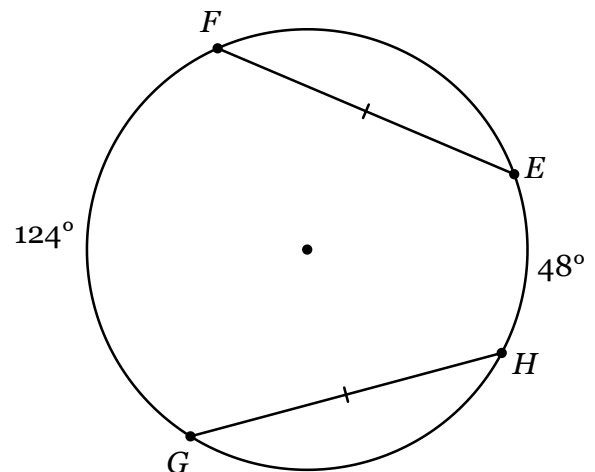
233°

Chords with one tick mark are congruent.

Find arc GH .

Write it in degrees, like 145°.

Add all four arcs of your circle. Do they make 360° ?



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F

ANSWER

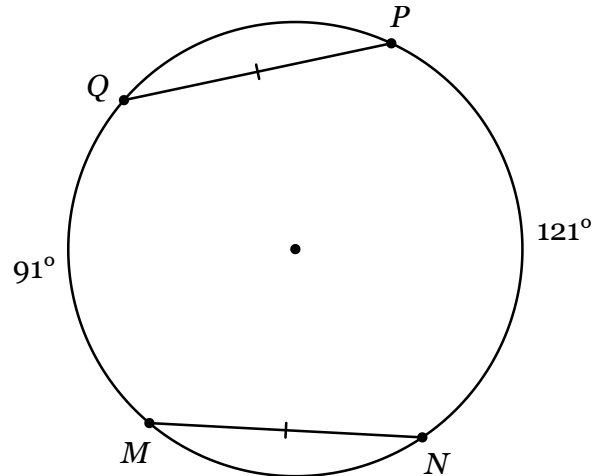
156°

Chords with one tick mark are congruent.

Find arc MPN .

Write it in degrees, like 145°.

Halve what is left of 360° when two of the arcs are the same.



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G

ANSWER

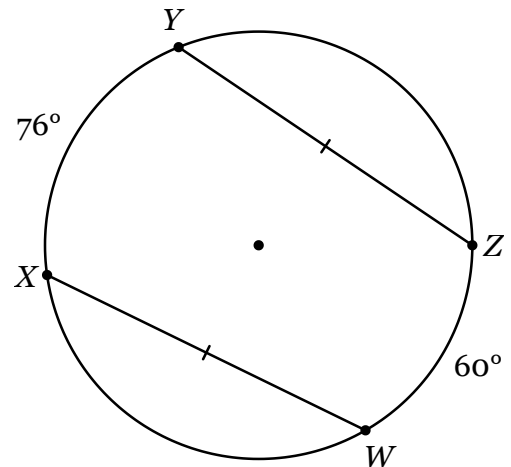
277°

Chords with one tick mark are congruent.

Find arc WX .

Write it in degrees, like 145°.

The two arcs under the chords with tick marks get one share each.



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H

ANSWER

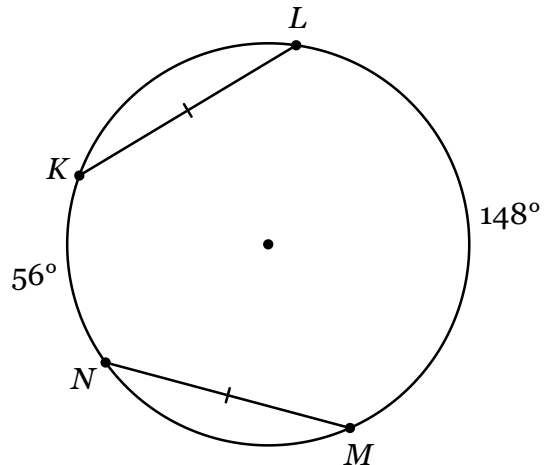
286°

Chords with one tick mark are congruent.

Find arc MN .

Write it in degrees, like 145° .

Take the two numbers away from 360° . What is left belongs to two arcs.



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J

ANSWER

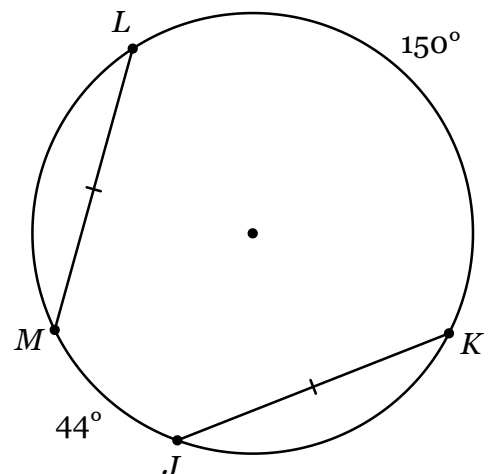
94°

Chords with one tick mark are congruent.

Find arc JK .

Write it in degrees, like 145° .

Is the arc you want more than half of the circle? Look at its middle letter.



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K

ANSWER

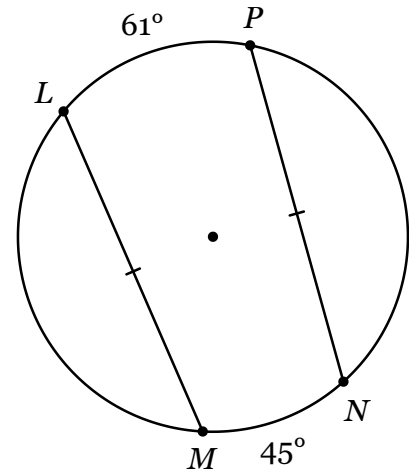
188°

Chords with one tick mark are congruent.

Find arc NLP .

Write it in degrees, like 145°.

Each congruent chord has its own arc. Those two arcs share what is left.



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L

ANSWER

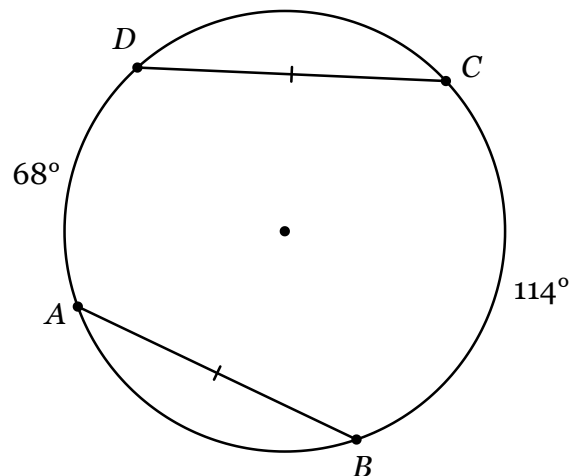
259°

Chords with one tick mark are congruent.

Find arc AB .

Write it in degrees, like 145°.

Two congruent chords cut two arcs of the same size. Share the rest of the circle between them.



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M

ANSWER

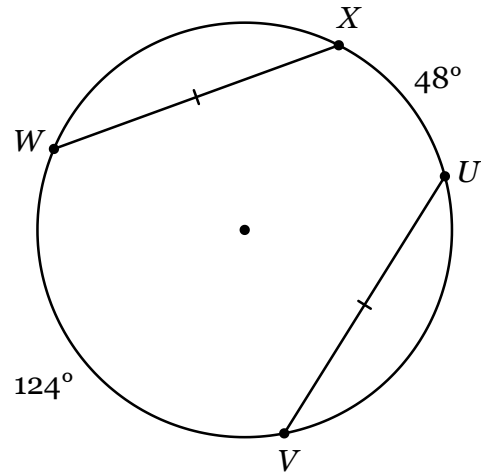
83°

Chords with one tick mark are congruent.

Find arc UV .

Write it in degrees, like 145° .

Find the middle letter on the circle. The arc runs through that point.



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N

ANSWER

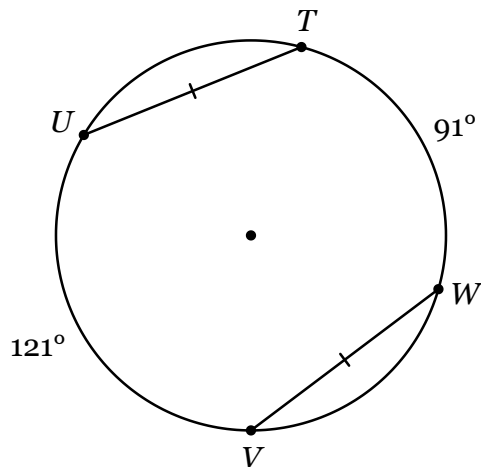
112°

Chords with one tick mark are congruent.

Find arc VUW .

Write it in degrees, like 145° .

Trace the arc from its first letter to its third letter, through the middle one.



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P

ANSWER

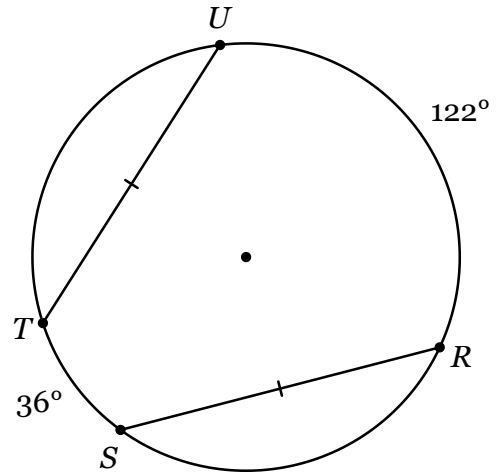
78°

Chords with one tick mark are congruent.

Find arc *RTS*.

Write it in degrees, like 145°.

A long arc and a short arc with the same two ends add to 360°.



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Q

ANSWER

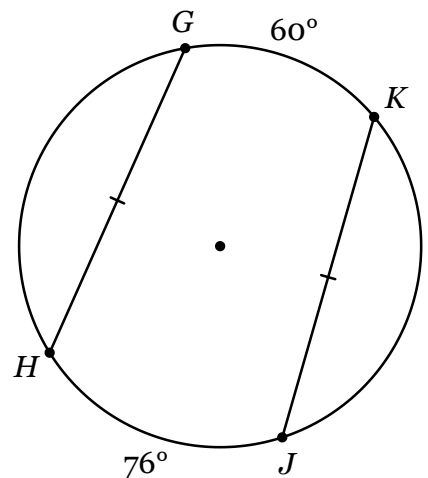
74°

Chords with one tick mark are congruent.

Find arc *GH*.

Write it in degrees, like 145°.

Does the arc pass the middle letter? Then it goes the long way around.



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R

Scavenger Hunt — where I went

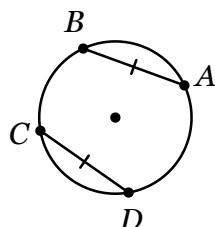
Arcs and chords

Name _____

Period _____

Date _____

For each card, write the name of the arc, then its measure. **Write the measure in degrees, like 145° .** Then find the card with your answer at the top. A clean run is eight lines. Each card has a line in italics under the boxed rule. **If you are on a card because you went wrong, its line says what to check. If you were right, skip it.**



Tick marks: chord AB and chord CD are congruent.

Arc AB (two letters) is the short way from A to B . **Arc ACB** (three letters) is the long way, through C .

In one circle, congruent chords cut congruent arcs. So arc AB and arc CD have the same measure.

The four arcs around a circle add to 360° . Check your answer with this.

Card letter	The arc the card asks for	Its measure, in degrees
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

What do two congruent chords of one circle always have?

Every number stands for a letter. Write the letter for each answer in the box above its number. Read the boxes you filled, left to right. **If they do not spell the answer, one of your answers is wrong.**

$74^\circ = W$ $78^\circ = T$ $83^\circ = N$ $89^\circ = W$ $94^\circ = I$ $101^\circ = A$ $112^\circ = N$ $127^\circ = T$ $156^\circ = I$ $178^\circ = R$ $188^\circ = C$ $224^\circ = S$
 $233^\circ = A$ $259^\circ = R$ $277^\circ = C$ $286^\circ = S$

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74° 78° 83° 89° 94° 101° 112° 127° 156° 178° 188° 224° 233° 259° 277° 286°



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Scavenger Hunt — answers

For the teacher

The ring in order, with the answer found on each card. A group may begin anywhere on it. Wherever it begins, eight right answers bring it back to that card.

M (89°) → D (233°) → F (94°) → K (277°) → H (112°) → P (286°) → J (78°) → Q (259°) → M

What do two congruent chords of one circle always have? The answer is *TWIN ARCS*! It is read along the boxes of the record sheet, which run from the smallest number to the largest.

	Card	What the card shows	Answer, and why	The common wrong answer on this card, and why	Letter of its top
1	M	Points A, B, C, D in order. Chords AB and CD have one tick mark each. Arc BC = 114°, arc DA = 68°. Find arc AB.	89°. The tick marks make chord AB congruent to chord CD, so arc AB and arc CD have the same measure. Together they are $360^\circ - 114^\circ - 68^\circ = 178^\circ$, so each is 89°.	178°. 178° is arc AB and arc CD together. The two arcs are congruent, so they share it: 89° each.	R
2	D	Points P, Q, R, S in order. Chords PQ and RS have one tick mark each. Arc QR = 45°, arc SP = 61°. Find arc RPS.	233°. The tick marks make chord PQ congruent to chord RS, so arc PQ and arc RS have the same measure. Together they are $360^\circ - 45^\circ - 61^\circ = 254^\circ$, so each is 127°. Arc RPS has three letters: it goes the long way from R to S, so it is $360^\circ - 127^\circ = 233^\circ$.	127°. 127° is arc RS, the short way. Arc RPS has three letters, so it is the long way: $360^\circ - 127^\circ = 233^\circ$.	W
3	F	Points E, F, G, H in order. Chords EF and GH have one tick mark each. Arc FG = 124°, arc HE = 48°. Find arc GH.	94°. The tick marks make chord EF congruent to chord GH, so arc EF and arc GH have the same measure. Together they are $360^\circ - 124^\circ - 48^\circ = 188^\circ$, so each is 94°.	188°. 188° is arc GH and arc EF together. The two arcs are congruent, so they share it: 94° each.	A
4	K	Points J, K, L, M in order. Chords JK and LM have one tick mark each. Arc KL = 150°, arc MJ = 44°. Find arc JLK.	277°. The tick marks make chord JK congruent to chord LM, so arc JK and arc LM have the same measure. Together they are $360^\circ - 150^\circ - 44^\circ = 166^\circ$, so each is 83°. Arc JLK has three letters: it goes the long way from J to K, so it is $360^\circ - 83^\circ = 277^\circ$.	83°. 83° is arc JK, the short way. Arc JLK has three letters, so it is the long way: $360^\circ - 83^\circ = 277^\circ$.	I
5	H	Points W, X, Y, Z in order. Chords WX and YZ have one tick mark each. Arc XY = 76°, arc ZW = 60°. Find arc WX.	112°. The tick marks make chord WX congruent to chord YZ, so arc WX and arc YZ have the same measure. Together they are $360^\circ - 76^\circ - 60^\circ = 224^\circ$, so each is 112°.	224°. 224° is arc WX and arc YZ together. The two arcs are congruent, so they share it: 112° each.	C
6	P	Points T, U, V, W in order. Chords TU and VW have one tick mark each. Arc UV = 121°, arc WT = 91°. Find arc VUW.	286°. The tick marks make chord TU congruent to chord VW, so arc TU and arc VW have the same measure. Together they are $360^\circ - 121^\circ - 91^\circ = 148^\circ$, so each is 74°. Arc VUW has three letters: it goes the long way from V to W, so it is $360^\circ - 74^\circ = 286^\circ$.	74°. 74° is arc VW, the short way. Arc VUW has three letters, so it is the long way: $360^\circ - 74^\circ = 286^\circ$.	N
7	J	Points K, L, M, N in order. Chords KL and MN have one tick mark each. Arc LM = 148°, arc NK = 56°. Find arc MN.	78°. The tick marks make chord KL congruent to chord MN, so arc KL and arc MN have the same measure. Together they are $360^\circ - 148^\circ - 56^\circ = 156^\circ$, so each is 78°.	156°. 156° is arc MN and arc KL together. The two arcs are congruent, so they share it: 78° each.	S
8	Q	Points R, S, T, U in order. Chords RS and TU have one tick mark each. Arc ST = 36°, arc UR = 122°. Find arc RTS.	259°. The tick marks make chord RS congruent to chord TU, so arc RS and arc TU have the same measure. Together they are $360^\circ - 36^\circ - 122^\circ = 202^\circ$, so each is 101°. Arc RTS has three letters: it goes the long way from R to S, so it is $360^\circ - 101^\circ = 259^\circ$.	101°. 101° is arc RS, the short way. Arc RTS has three letters, so it is the long way: $360^\circ - 101^\circ = 259^\circ$.	T

Scavenger Hunt — the cards off the ring

For the teacher

A group reaches these eight cards only by a wrong answer. The number at the top of each one is the wrong answer from one ring card. Its right answer is the number at the top of that ring card, so the group goes to the card it got wrong and tries it again. If the group makes the same mistake here, it goes to another card off the ring. So a second wrong answer never moves a group forward.

Card	What the card shows	Answer, and why	The common wrong answer on this card, and why	Letter of its top
E	Points F, G, H, J in order. Chords FG and HJ have one tick mark each. Arc GH = 36° , arc JF = 122° . Find arc FHG.	259° . The tick marks make chord FG congruent to chord HJ, so arc FG and arc HJ have the same measure. Together they are $360^\circ - 36^\circ - 122^\circ = 202^\circ$, so each is 101° . Arc FHG has three letters: it goes the long way from F to G, so it is $360^\circ - 101^\circ = 259^\circ$.	101° . 101° is arc FG, the short way. Arc FHG has three letters, so it is the long way: $360^\circ - 101^\circ = 259^\circ$.	R
C	Points B, C, D, E in order. Chords BC and DE have one tick mark each. Arc CD = 114° , arc EB = 68° . Find arc DE.	89° . The tick marks make chord BC congruent to chord DE, so arc BC and arc DE have the same measure. Together they are $360^\circ - 114^\circ - 68^\circ = 178^\circ$, so each is 89° .	178° . 178° is arc DE and arc BC together. The two arcs are congruent, so they share it: 89° each.	T
L	Points L, M, N, P in order. Chords LM and NP have one tick mark each. Arc MN = 45° , arc PL = 61° . Find arc NLP.	233° . The tick marks make chord LM congruent to chord NP, so arc LM and arc NP have the same measure. Together they are $360^\circ - 45^\circ - 61^\circ = 254^\circ$, so each is 127° . Arc NLP has three letters: it goes the long way from N to P, so it is $360^\circ - 127^\circ = 233^\circ$.	127° . 127° is arc NP, the short way. Arc NLP has three letters, so it is the long way: $360^\circ - 127^\circ = 233^\circ$.	C
N	Points U, V, W, X in order. Chords UV and WX have one tick mark each. Arc VW = 124° , arc XU = 48° . Find arc UV.	94° . The tick marks make chord UV congruent to chord WX, so arc UV and arc WX have the same measure. Together they are $360^\circ - 124^\circ - 48^\circ = 188^\circ$, so each is 94° .	188° . 188° is arc UV and arc WX together. The two arcs are congruent, so they share it: 94° each.	N
B	Points C, D, E, F in order. Chords CD and EF have one tick mark each. Arc DE = 150° , arc FC = 44° . Find arc ECF.	277° . The tick marks make chord CD congruent to chord EF, so arc CD and arc EF have the same measure. Together they are $360^\circ - 150^\circ - 44^\circ = 166^\circ$, so each is 83° . Arc ECF has three letters: it goes the long way from E to F, so it is $360^\circ - 83^\circ = 277^\circ$.	83° . 83° is arc EF, the short way. Arc ECF has three letters, so it is the long way: $360^\circ - 83^\circ = 277^\circ$.	S
R	Points G, H, J, K in order. Chords GH and JK have one tick mark each. Arc HJ = 76° , arc KG = 60° . Find arc GH.	112° . The tick marks make chord GH congruent to chord JK, so arc GH and arc JK have the same measure. Together they are $360^\circ - 76^\circ - 60^\circ = 224^\circ$, so each is 112° .	224° . 224° is arc GH and arc JK together. The two arcs are congruent, so they share it: 112° each.	W
G	Points M, N, P, Q in order. Chords MN and PQ have one tick mark each. Arc NP = 121° , arc QM = 91° . Find arc MPN.	286° . The tick marks make chord MN congruent to chord PQ, so arc MN and arc PQ have the same measure. Together they are $360^\circ - 121^\circ - 91^\circ = 148^\circ$, so each is 74° . Arc MPN has three letters: it goes the long way from M to N, so it is $360^\circ - 74^\circ = 286^\circ$.	74° . 74° is arc MN, the short way. Arc MPN has three letters, so it is the long way: $360^\circ - 74^\circ = 286^\circ$.	I
A	Points S, T, U, V in order. Chords ST and UV have one tick mark each. Arc TU = 148° , arc VS = 56° . Find arc UV.	78° . The tick marks make chord ST congruent to chord UV, so arc ST and arc UV have the same measure. Together they are $360^\circ - 148^\circ - 56^\circ = 156^\circ$, so each is 78° .	156° . 156° is arc UV and arc ST together. The two arcs are congruent, so they share it: 78° each.	A

Other mistakes lead to no card. A group might give the long arc when the card asks for the short one, make both mistakes at once, copy one of the printed arcs, or leave one printed arc out of the 360° . Its answer is then not the number at the top of any card.