

SCAVENGER HUNT



CENTRAL ANGLES AND ARC MEASURE

Central Angles and Arc Measure: Which Arc?

Minor arcs, major arcs and semicircles · whole degrees · the cards
check the answers

FREE

ANSWER

148°

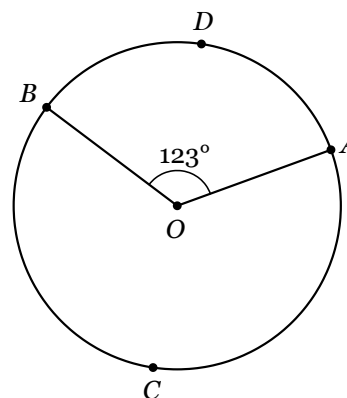
O is the center.

Find the measure of arc ACB.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Three letters name the long way round. Trace that way with a finger first.

H



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Scavenger Hunt — how to run it

a full class period

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: *H P G N A R J D*.
2. **Say this once:** “*Read the name of the arc. Two letters mean the minor arc. Three letters mean the long way, through the middle letter. Write the answer in whole degrees, like 125° . 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 a minor arc, a major arc and a semicircle with their names.
Answers	pages 12–13, for you only. Do not put them up in the room.

Every card shows a circle with its center O, four lettered points, and one or two angles at O with their degrees. The card asks for one arc by its name. 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. An arc measures the same as its central angle. A major arc measures 360° minus the minor arc with the same ends, and a semicircle measures 180° .

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. On three ring cards the common mistake is to give the angle that is drawn when the name asks for the other arc. On three the card has a diameter, and the mistake is to use 360° where the diameter gives 180° , or to go the short way when the name goes past the end of the diameter. On two the student adds two angles, and the mistake is to give the long way round. Each of these lands on a card off the ring. 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. A group that arrived by a right answer skips it. Guessing does not work: no single rule, such as always taking 360° minus the number, gets more than eight of the cards. If a group keeps coming back to the same cards, ask: “*Put a finger on the first letter of the name. Trace the arc to the last letter. Which way did you go?*”



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

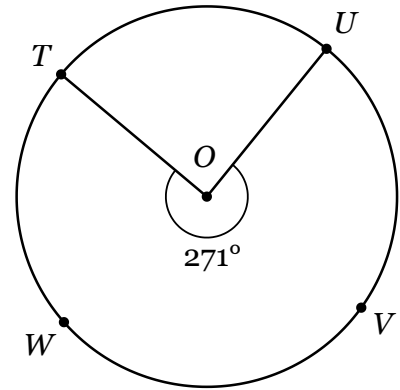
160°

O is the center.

Find the measure of arc TU.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

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



A

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ANSWER

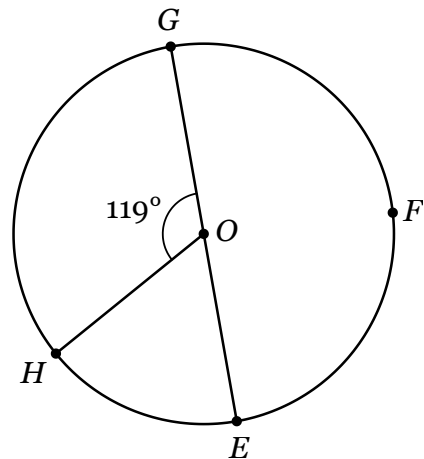
200°

O is the center. GE is a diameter.

Find the measure of arc HFE.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Two letters mean the minor arc. Which angle marks sit inside it?



B

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ANSWER

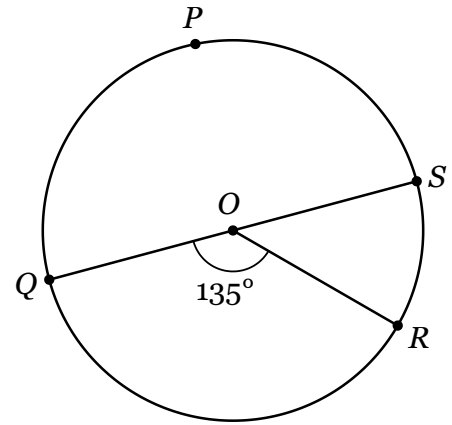
61°

O is the center. QS is a diameter.

Find the measure of arc RS.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Start at the first letter. Go through the middle letter. Stop at the third.



C

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ANSWER

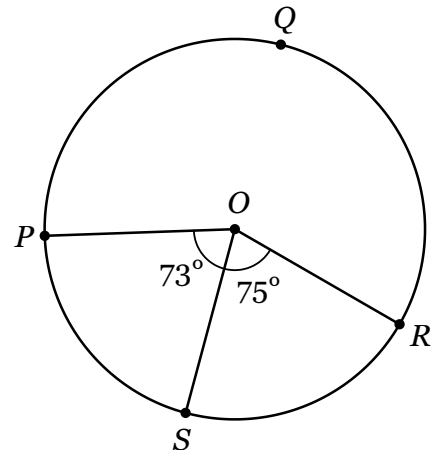
247°

O is the center.

Find the measure of arc RP.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Arc addition is angle addition. Which angles lie along the arc?



D

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ANSWER

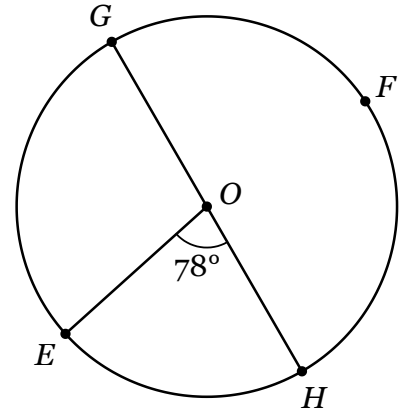
113°

O is the center. HG is a diameter.

Find the measure of arc EFG.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

The major arc and the minor arc make the whole circle. Which one does the name give?



E

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ANSWER

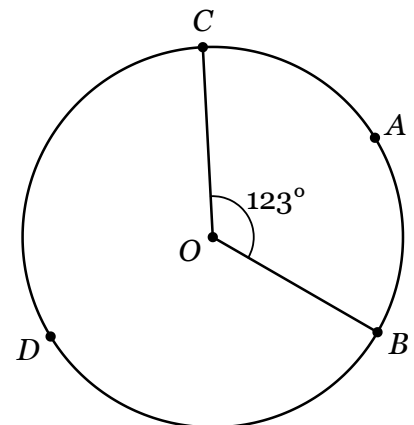
225°

O is the center.

Find the measure of arc BDC.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

A diameter cuts the circle in half. Is your arc inside one half?



F

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ANSWER

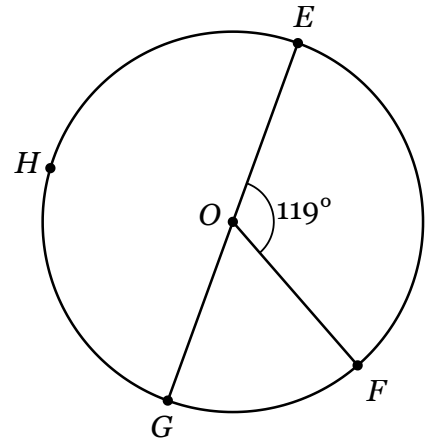
45°

O is the center. EG is a diameter.

Find the measure of arc FHG.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Read the name one letter at a time. Which points does the arc pass?



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G

ANSWER

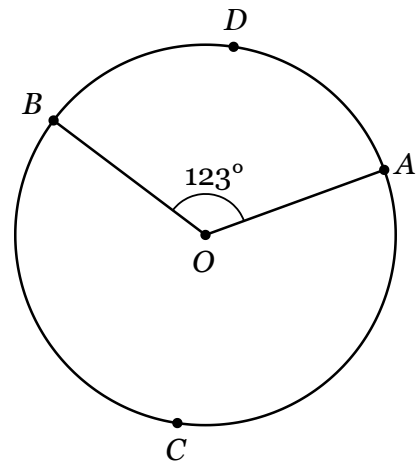
148°

O is the center.

Find the measure of arc ACB.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Three letters name the long way round. Trace that way with a finger first.



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H

ANSWER

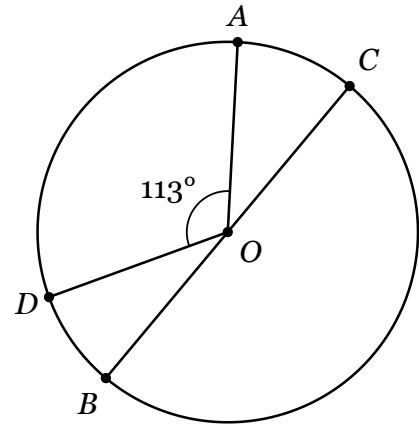
258°

O is the center. CB is a diameter.

Find the measure of arc DCA.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

A diameter in the drawing does not always matter. Check the ends of the arc.



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J

ANSWER

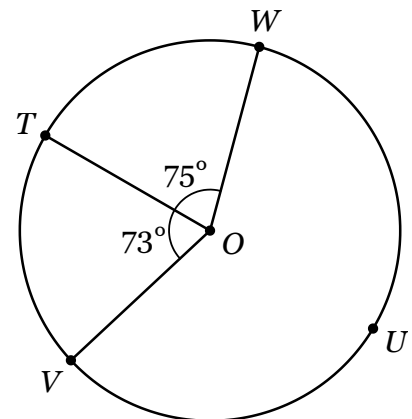
123°

O is the center.

Find the measure of arc WV.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Put a finger on the middle letter of the name. Which arc holds that point?



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K

ANSWER

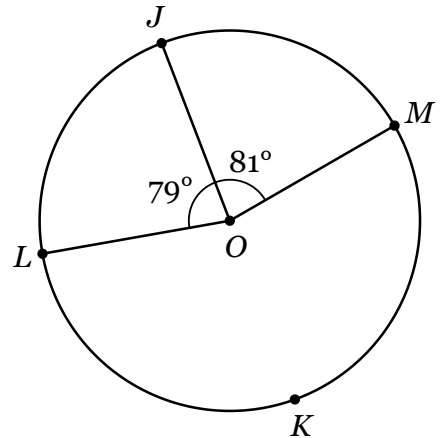
271°

O is the center.

Find the measure of arc LM.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

The angle mark at O goes one way round. Is that the arc in the name?



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L

ANSWER

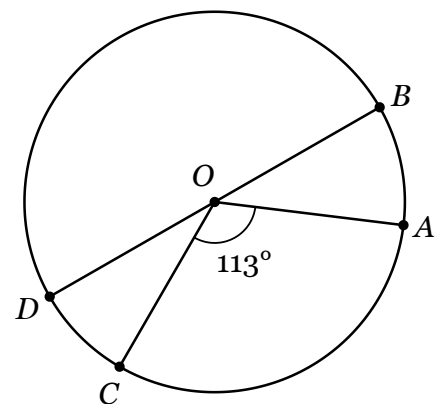
212°

O is the center. BD is a diameter.

Find the measure of arc CBA.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

The arc from the first letter to the second goes the short way. Add those angles.



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M

ANSWER

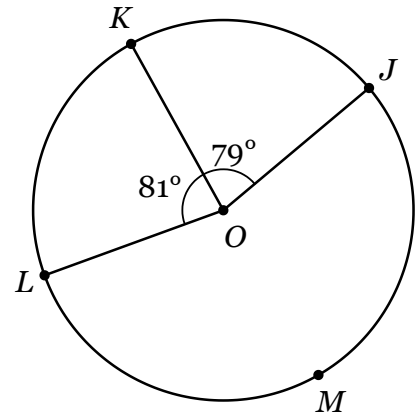
299°

O is the center.

Find the measure of arc JL.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Two letters name the short way round. Add the angles along that way.



N

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ANSWER

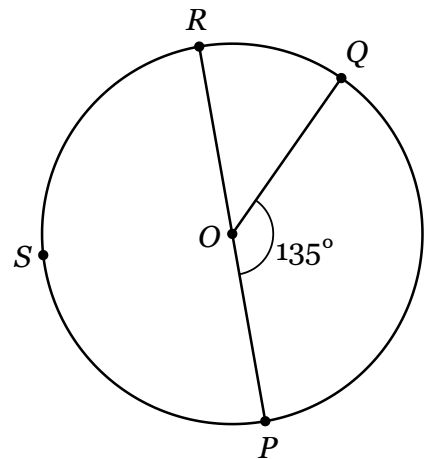
237°

O is the center. PR is a diameter.

Find the measure of arc QR.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Find the line through O. Each half of the circle measures 180° .



P

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ANSWER

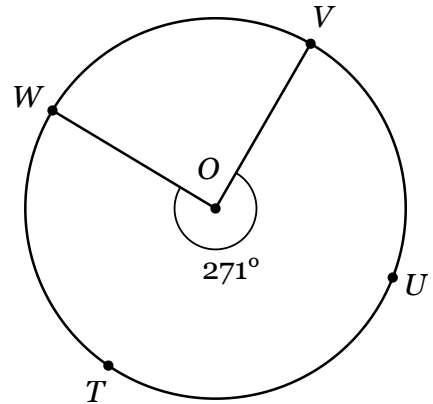
102°

O is the center.

Find the measure of arc VW.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

Split the arc at the end of the diameter. Find each piece, then add.



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Q

ANSWER

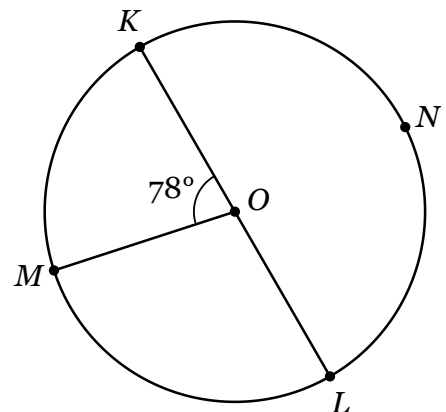
89°

O is the center. KL is a diameter.

Find the measure of arc MNL.

Two letters name the minor arc. Three letters name a major arc or a semicircle.

A three-letter arc can run past the end of a diameter. Find both pieces.



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R

Scavenger Hunt — where I went

Central angles and arc measure

Name _____

Period _____

Date _____

For each card, write its letter, the name of the arc, and its measure. **Write the measure in whole degrees, like 125° .** 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.**

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

Two letters name the minor arc, like arc AB . Three letters, with a point of the arc in the middle, name a major arc or a semicircle, like arc AXB .

A minor arc measures the same as its central angle. A major arc measures 360° minus the minor arc. A semicircle measures 180° .

Card letter	The arc (its name)	Its measure, in degrees
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

What do you call a circle that is good at everything?

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.**

$45^\circ = A$ $61^\circ = R$ $89^\circ = L$ $102^\circ = A$ $113^\circ = O$ $123^\circ = U$ $148^\circ = L$ $160^\circ = R$ $200^\circ = L$ $212^\circ = N$ $225^\circ = D$ $237^\circ = O$
 $247^\circ = U$ $258^\circ = N$ $271^\circ = L$ $299^\circ = D$

45°	61°	89°	102°	113°	123°	148°	160°	200°	212°	225°	237°	247°	258°	271°	299°



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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.

H (237°) → P (45°) → G (299°) → N (160°) → A (89°) → R (258°) → J (247°) → D (148°) → H

What do you call a circle that is good at everything? The answer is *ALL-ROUND!* It is read along the boxes of the record sheet, which run from the smallest number to the largest. The cards name 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.

Card	What the card shows	Answer, and why	The common wrong answer on this card, and why	Letter of its top
1 H	Angle AOB = 123°. Find arc ACB.	237° . Arc ACB has three letters, so it is the major arc from A to B through C. The minor arc AB measures 123°, the same as its central angle, so arc ACB = $360^\circ - 123^\circ = 237^\circ$.	123°. 123° is the minor arc AB, the angle that is drawn. The name has three letters, so it asks for the other, longer arc.	L
2 P	Angle POQ = 135°. PR is a diameter. Find arc QR.	45° . PR is a diameter, so each half of the circle measures 180°. Arc PQ = 135°, so arc QR = $180^\circ - 135^\circ = 45^\circ$.	225°. $225^\circ = 360^\circ - 135^\circ$ uses the whole circle. But arc QR is on one half of the diameter, and that half measures 180°.	O
3 G	Angle FOE = 119°. EG is a diameter. Find arc FHG.	299° . EG is a diameter. Arc FHG runs from F past E, through H, to G. Arc FE = 119° and the half circle from E to G is 180°, so arc FHG = $119^\circ + 180^\circ = 299^\circ$.	61°. $61^\circ = 180^\circ - 119^\circ$ is arc FG, the short way from F to G. The middle letter H says the arc goes the long way.	A
4 N	Angle JOK = 79° and angle KOL = 81°. Find arc JL.	160° . Arc JL has two letters, so it is the minor arc from J to L, which passes K. Arc addition: $79^\circ + 81^\circ = 160^\circ$.	200°. $200^\circ = 360^\circ - 160^\circ$ is the major arc from J to L, the long way round. Two letters name the minor arc.	D
5 A	Angle TOU = 271° (marked the long way round). Find arc TU.	89° . The angle at O is marked the long way round, so its 271° is the major arc. Arc TU has two letters, so it is the minor arc: $360^\circ - 271^\circ = 89^\circ$.	271°. 271° is the major arc, the one the angle mark covers. Two letters name the minor arc.	R
6 R	Angle KOM = 78°. KL is a diameter. Find arc MNL.	258° . KL is a diameter. Arc MNL runs from M past K, through N, to L. Arc MK = 78° and the half circle from K to L is 180°, so arc MNL = $78^\circ + 180^\circ = 258^\circ$.	102°. $102^\circ = 180^\circ - 78^\circ$ is arc ML, the short way from M to L. The middle letter N says the arc goes the long way.	L
7 J	Angle AOD = 113°. CB is a diameter. Find arc DCA.	247° . Arc DCA has three letters, so it is the major arc from D to A through C. The minor arc DA measures 113°, the same as its central angle, so arc DCA = $360^\circ - 113^\circ = 247^\circ$. The diameter CB does not end at D or A, so it does not change the answer.	113°. 113° is the minor arc DA, the angle that is drawn. The name has three letters, so it asks for the other, longer arc.	N
8 D	Angle SOR = 75° and angle POS = 73°. Find arc RP.	148° . Arc RP has two letters, so it is the minor arc from R to P, which passes S. Arc addition: $75^\circ + 73^\circ = 148^\circ$.	212°. $212^\circ = 360^\circ - 148^\circ$ is the major arc from R to P, the long way round. Two letters name the minor arc.	U

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
K	Angle WOT = 75° and angle TOV = 73° . Find arc WV.	148° . Arc WV has two letters, so it is the minor arc from W to V, which passes T. Arc addition: $75^\circ + 73^\circ = 148^\circ$.	212°. $212^\circ = 360^\circ - 148^\circ$ is the major arc from W to V, the long way round. Two letters name the minor arc.	U
F	Angle BOC = 123° . Find arc BDC.	237° . Arc BDC has three letters, so it is the major arc from B to C through D. The minor arc BC measures 123° , the same as its central angle, so arc BDC = $360^\circ - 123^\circ = 237^\circ$.	123°. 123° is the minor arc BC, the angle that is drawn. The name has three letters, so it asks for the other, longer arc.	D
C	Angle QOR = 135° . QS is a diameter. Find arc RS.	45° . QS is a diameter, so each half of the circle measures 180° . Arc QR = 135° , so arc RS = $180^\circ - 135^\circ = 45^\circ$.	225°. $225^\circ = 360^\circ - 135^\circ$ uses the whole circle. But arc RS is on one half of the diameter, and that half measures 180° .	R
B	Angle GOH = 119° . GE is a diameter. Find arc HFE.	299° . GE is a diameter. Arc HFE runs from H past G, through F, to E. Arc HG = 119° and the half circle from G to E is 180° , so arc HFE = $119^\circ + 180^\circ = 299^\circ$.	61°. $61^\circ = 180^\circ - 119^\circ$ is arc HE, the short way from H to E. The middle letter F says the arc goes the long way.	L
L	Angle JOL = 79° and angle MOJ = 81° . Find arc LM.	160° . Arc LM has two letters, so it is the minor arc from L to M, which passes J. Arc addition: $79^\circ + 81^\circ = 160^\circ$.	200°. $200^\circ = 360^\circ - 160^\circ$ is the major arc from L to M, the long way round. Two letters name the minor arc.	L
Q	Angle WOV = 271° (marked the long way round). Find arc VW.	89° . The angle at O is marked the long way round, so its 271° is the major arc. Arc VW has two letters, so it is the minor arc: $360^\circ - 271^\circ = 89^\circ$.	271°. 271° is the major arc, the one the angle mark covers. Two letters name the minor arc.	A
E	Angle EOH = 78° . HG is a diameter. Find arc EFG.	258° . HG is a diameter. Arc EFG runs from E past H, through F, to G. Arc EH = 78° and the half circle from H to G is 180° , so arc EFG = $78^\circ + 180^\circ = 258^\circ$.	102°. $102^\circ = 180^\circ - 78^\circ$ is arc EG, the short way from E to G. The middle letter F says the arc goes the long way.	O
M	Angle COA = 113° . BD is a diameter. Find arc CBA.	247° . Arc CBA has three letters, so it is the major arc from C to A through B. The minor arc CA measures 113° , the same as its central angle, so arc CBA = $360^\circ - 113^\circ = 247^\circ$. The diameter BD does not end at C or A, so it does not change the answer.	113°. 113° is the minor arc CA, the angle that is drawn. The name has three letters, so it asks for the other, longer arc.	N

Other mistakes lead to no card. A group might copy the number at O, take 180° minus it or 180° plus it, or use only one of two angles. Its answer is then not the number at the top of any card.