

SCAVENGER HUNT



INSCRIBED ANGLES ON A DIAMETER AND INSCRIBED POLYGONS

The Angle in a Semicircle, Both Ways

A diameter gives a right angle · a right angle gives a diameter · the cards
check the answers

FREE

ANSWER

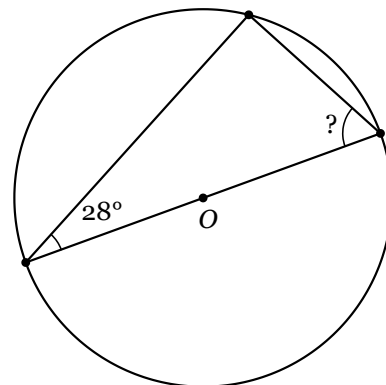
29

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

*A diameter makes a right angle at the third point. Use it in
the sum.*



M

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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 A K G L H B*.
2. **Say this once:** “Some cards give you a diameter and ask for an angle. Some give you a right angle and ask for the radius. First decide which one you have. Then walk to the card with your 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 both facts as drawings. A calculator helps with the squares.
Answers	pages 12–13, for you only. Do not put them up in the room.

Two kinds of card take turns around the ring. On four of the ring cards the center O is marked on a chord, so that chord is a diameter. A third point of the circle is joined to its ends. The angle at the third point is 90° , so the two other angles add to 90° . That right angle is not marked on purpose: the student must know it. On the other four cards a right triangle has its corners on the circle and its right angle marked. The side across from the right angle is a diameter, so the radius is half of it. Every answer is a whole number.

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. There are two mistakes. In the first, the student leaves the right angle out and takes 180° minus the given angle. In the second, the student finds the longest side and stops, giving the diameter as the radius. 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 90 minus the number on the card, gets more than eight of the cards. If a group keeps coming back to the same cards, ask: “*Were you given a diameter or a right angle? Where is the right angle?*”



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

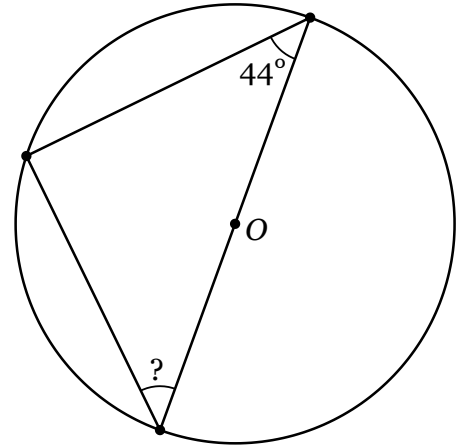
25

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

The three angles of a triangle add to 180° . One of them is 90° here.



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A

ANSWER

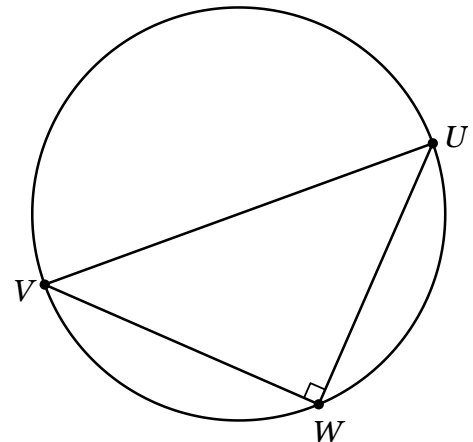
38°

The three corners are on the circle. $UW = 40$ and $VW = 42$.

Find the radius of the circle.

Write a whole number, like 12.

Check: two radii make the longest side of the triangle.



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B

ANSWER

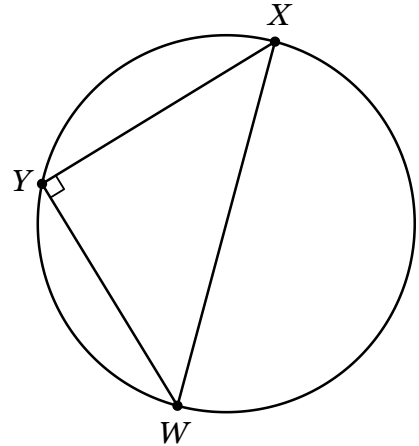
152°

The three corners are on the circle. $WY = 40$ and $XY = 42$.

Find the radius of the circle.

Write a whole number, like 12.

The angle at the third point is 90° . Is that in your sum?



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C

ANSWER

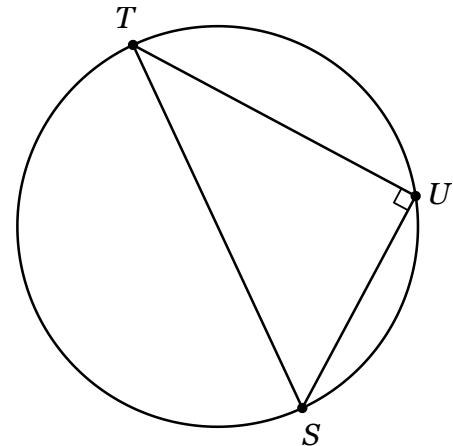
62°

The three corners are on the circle. $SU = 30$ and $TU = 40$.

Find the radius of the circle.

Write a whole number, like 12.

Find the side across from the square. It is a diameter, not a radius.



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D

ANSWER

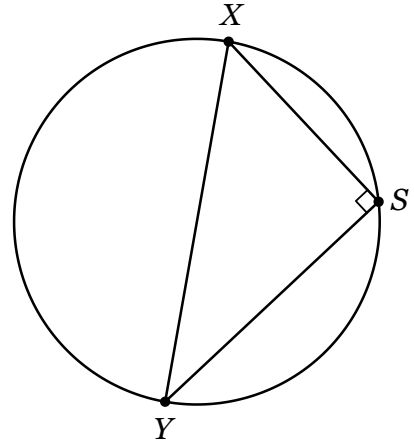
145°

The three corners are on the circle. $XS = 6$ and $YS = 8$.

Find the radius of the circle.

Write a whole number, like 12.

Two angles of the triangle plus 90° make 180° . Check your answer.



E

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ANSWER

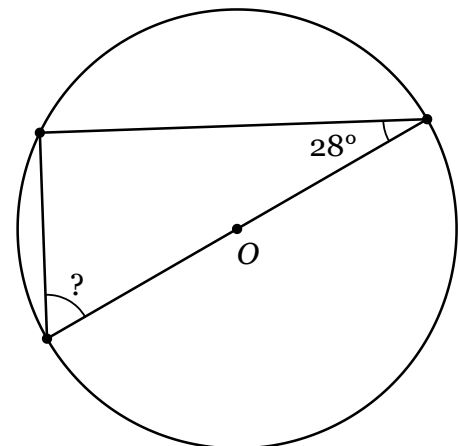
50

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

The longest side is a diameter. The radius is half of it.



F

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ANSWER

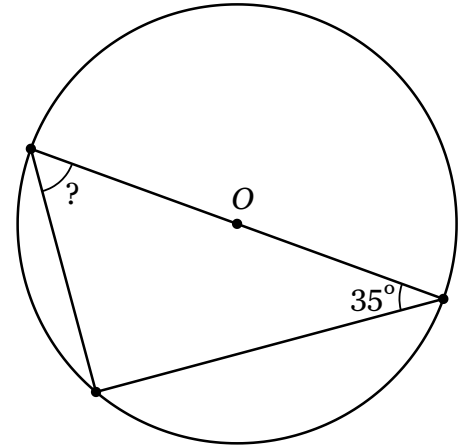
5

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

Is the third corner on the circle? Then its angle is 90° .



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G

ANSWER

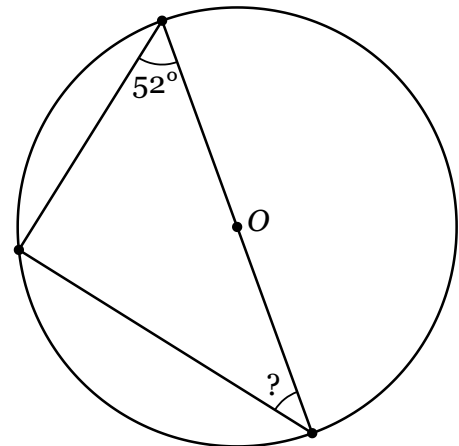
53

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

The two small angles must add to 90° . Check your answer with that.



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H

ANSWER

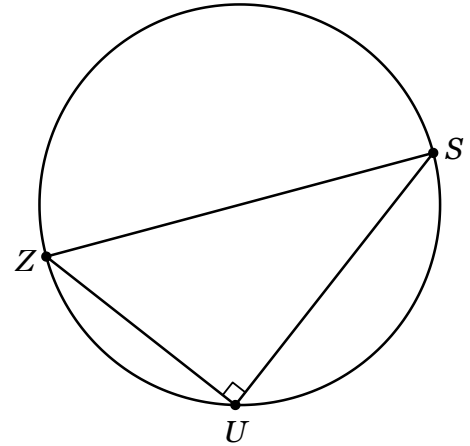
136°

The three corners are on the circle. $ZU = 30$ and $SU = 40$.

Find the radius of the circle.

Write a whole number, like 12.

An angle in a semicircle is a right angle. Count it with the other two.



J

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ANSWER

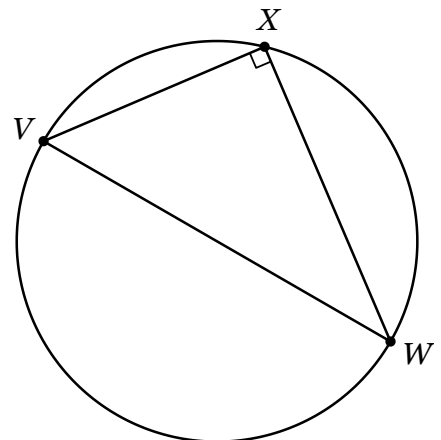
46°

The three corners are on the circle. $VX = 6$ and $WX = 8$.

Find the radius of the circle.

Write a whole number, like 12.

A radius is half of a diameter. Which side is the diameter?



K

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ANSWER

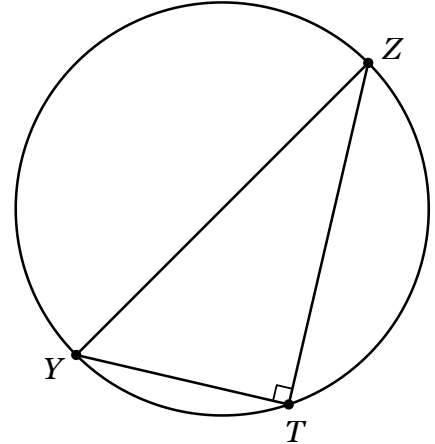
55°

The three corners are on the circle. $YT = 56$ and $ZT = 90$.

Find the radius of the circle.

Write a whole number, like 12.

Which side does not touch the square? That side goes through the center.



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L

ANSWER

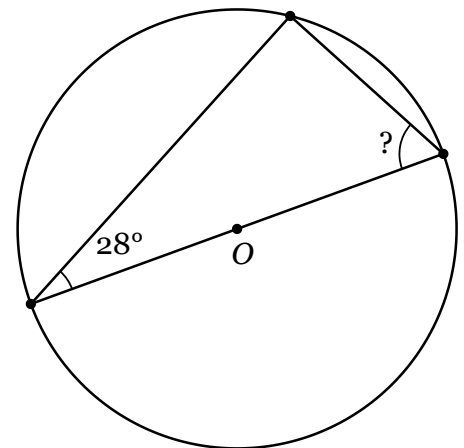
29

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

A diameter makes a right angle at the third point. Use it in the sum.



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M

ANSWER

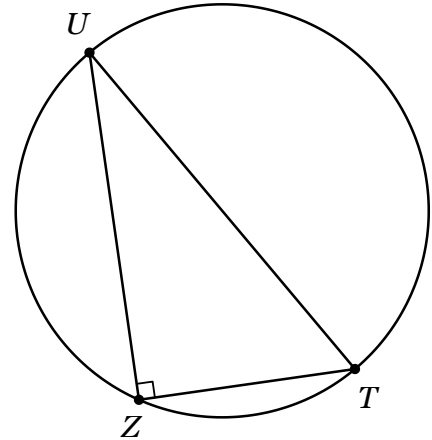
128°

The three corners are on the circle. $TZ = 56$ and $UZ = 90$.

Find the radius of the circle.

Write a whole number, like 12.

Each small angle of a right triangle is less than 90° . Is yours?



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N

ANSWER

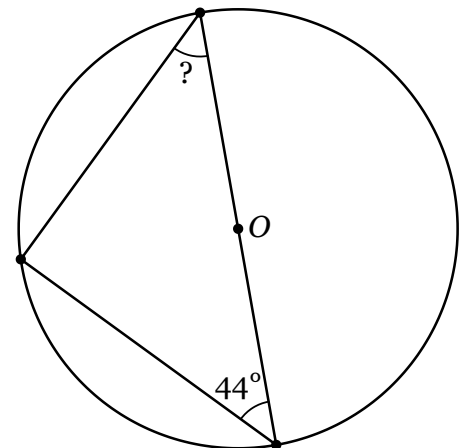
10

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

Is your answer the whole diameter? A radius is only half of it.



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P

ANSWER

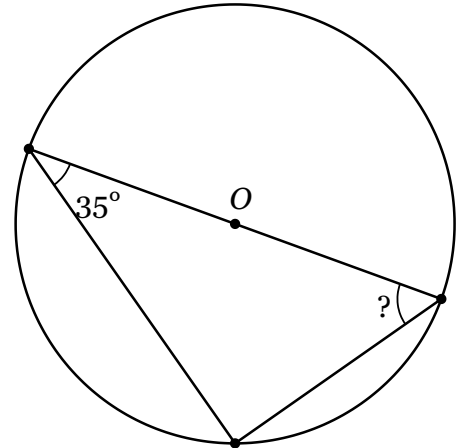
106

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

Two radii fit along the side across from the square. Check that.



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Q

ANSWER

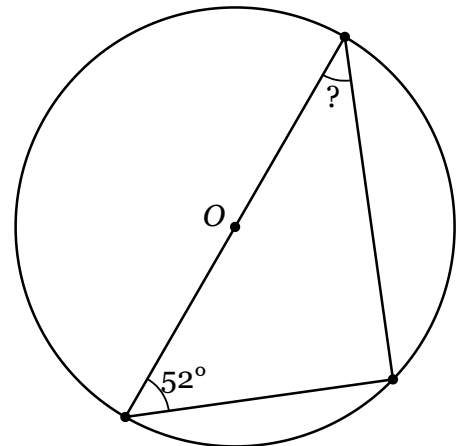
58

O is the center of the circle.

Find the angle marked ?.

Write it in degrees, like 41° .

Find the long side first. Then take half of it for the radius.



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R

Scavenger Hunt — where I went

The angle in a semicircle

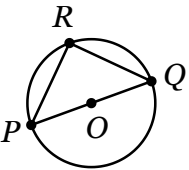
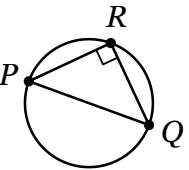
Name _____

Period _____

Date _____

For each card, first write what you were given: a diameter, or a right angle. Then write your answer.

Angles are whole degrees, like 41° . Lengths are whole numbers, like 12. 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.**

	A diameter gives a right angle. O is the center and it is on PQ, so PQ is a diameter. R is on the circle. So the angle at R is 90°.		A right angle gives a diameter. The angle at R is 90° and P, Q and R are on the circle. So PQ, the side across from the square, is a diameter. The radius is half of PQ. The three angles of a triangle add to 180°.
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Card letter	I was given: a diameter or a right angle?	My answer
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

A right triangle has its three corners on a circle. What is its longest side also called?

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.**

5 = D 10 = A 25 = I 29 = A 38° = M 46° = E 50 = R 53 = T 55° = E 58 = D 62° = R 106 = I 128° = M 136° = E
145° = T 152° = E

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5	10	25	29	38°	46°	50	53	55°	58	62°	106	128°	136°	145°	152°
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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 (62°) → D (25) → A (46°) → K (5) → G (55°) → L (53) → H (38°) → B (29) → M

A right triangle has its three corners on a circle. What is its longest side also called? The answer is *DIAMETER*! 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	O is the center. The angle at one end of the diameter is 28°.	62° . O is on the chord, so it is a diameter, and the angle at the third point is 90°. So the ? is $180^\circ - 90^\circ - 28^\circ = 62^\circ$.	152°. $180^\circ - 28^\circ = 152^\circ$. The right angle at the third point is left out of the angle sum.	A
2	D	Right angle at U; SU = 30 and TU = 40.	25 . The side across from the right angle, ST, is a diameter. $ST^2 = 30^2 + 40^2 = 2500$, so ST = 50 and the radius is $50 \div 2 = 25$.	50. 50 is the whole diameter ST. The radius is half of it.	R
3	A	O is the center. The angle at one end of the diameter is 44°.	46° . O is on the chord, so it is a diameter, and the angle at the third point is 90°. So the ? is $180^\circ - 90^\circ - 44^\circ = 46^\circ$.	136°. $180^\circ - 44^\circ = 136^\circ$. The right angle at the third point is left out of the angle sum.	I
4	K	Right angle at X; VX = 6 and WX = 8.	5 . The side across from the right angle, VW, is a diameter. $VW^2 = 6^2 + 8^2 = 100$, so VW = 10 and the radius is $10 \div 2 = 5$.	10. 10 is the whole diameter VW. The radius is half of it.	E
5	G	O is the center. The angle at one end of the diameter is 35°.	55° . O is on the chord, so it is a diameter, and the angle at the third point is 90°. So the ? is $180^\circ - 90^\circ - 35^\circ = 55^\circ$.	145°. $180^\circ - 35^\circ = 145^\circ$. The right angle at the third point is left out of the angle sum.	D
6	L	Right angle at T; YT = 56 and ZT = 90.	53 . The side across from the right angle, YZ, is a diameter. $YZ^2 = 56^2 + 90^2 = 11236$, so YZ = 106 and the radius is $106 \div 2 = 53$.	106. 106 is the whole diameter YZ. The radius is half of it.	E
7	H	O is the center. The angle at one end of the diameter is 52°.	38° . O is on the chord, so it is a diameter, and the angle at the third point is 90°. So the ? is $180^\circ - 90^\circ - 52^\circ = 38^\circ$.	128°. $180^\circ - 52^\circ = 128^\circ$. The right angle at the third point is left out of the angle sum.	T
8	B	Right angle at W; UW = 40 and VW = 42.	29 . The side across from the right angle, UV, is a diameter. $UV^2 = 40^2 + 42^2 = 3364$, so UV = 58 and the radius is $58 \div 2 = 29$.	58. 58 is the whole diameter UV. The radius is half of it.	M

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
C	Right angle at Y; WY = 40 and XY = 42.	29. The side across from the right angle, WX, is a diameter. $WX^2 = 40^2 + 42^2 = 3364$, so WX = 58 and the radius is $58 \div 2 = 29$.	58. 58 is the whole diameter WX. The radius is half of it.	E
F	O is the center. The angle at one end of the diameter is 28° .	62°. O is on the chord, so it is a diameter, and the angle at the third point is 90° . So the ? is $180^\circ - 90^\circ - 28^\circ = 62^\circ$.	152° . $180^\circ - 28^\circ = 152^\circ$. The right angle at the third point is left out of the angle sum.	R
J	Right angle at U; ZU = 30 and SU = 40.	25. The side across from the right angle, ZS, is a diameter. $ZS^2 = 30^2 + 40^2 = 2500$, so ZS = 50 and the radius is $50 \div 2 = 25$.	50. 50 is the whole diameter ZS. The radius is half of it.	E
P	O is the center. The angle at one end of the diameter is 44° .	46°. O is on the chord, so it is a diameter, and the angle at the third point is 90° . So the ? is $180^\circ - 90^\circ - 44^\circ = 46^\circ$.	136° . $180^\circ - 44^\circ = 136^\circ$. The right angle at the third point is left out of the angle sum.	A
E	Right angle at S; XS = 6 and YS = 8.	5. The side across from the right angle, XY, is a diameter. $XY^2 = 6^2 + 8^2 = 100$, so XY = 10 and the radius is $10 \div 2 = 5$.	10. 10 is the whole diameter XY. The radius is half of it.	T
Q	O is the center. The angle at one end of the diameter is 35° .	55°. O is on the chord, so it is a diameter, and the angle at the third point is 90° . So the ? is $180^\circ - 90^\circ - 35^\circ = 55^\circ$.	145° . $180^\circ - 35^\circ = 145^\circ$. The right angle at the third point is left out of the angle sum.	I
N	Right angle at Z; TZ = 56 and UZ = 90.	53. The side across from the right angle, TU, is a diameter. $TU^2 = 56^2 + 90^2 = 11236$, so TU = 106 and the radius is $106 \div 2 = 53$.	106. 106 is the whole diameter TU. The radius is half of it.	M
R	O is the center. The angle at one end of the diameter is 52° .	38°. O is on the chord, so it is a diameter, and the angle at the third point is 90° . So the ? is $180^\circ - 90^\circ - 52^\circ = 38^\circ$.	128° . $180^\circ - 52^\circ = 128^\circ$. The right angle at the third point is left out of the angle sum.	D

Other mistakes lead to no card. A group might copy the given angle, give 90° as the answer, take a leg as the diameter and halve it, or add the two legs. Its answer is then not the number at the top of any card.