

SCAVENGER HUNT



ISOSCELES AND EQUILATERAL TRIANGLES

Which Two Angles Are Equal?

Two equal sides on every card · the triangle is turned · the cards check the answers

FREE

ANSWER

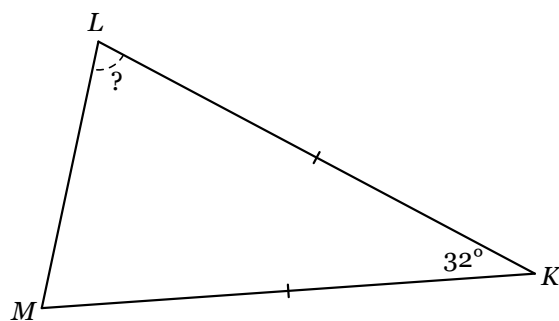
36°

Two sides have ticks. They are equal.

$$m\angle K = 32^\circ$$

What is $m\angle L$?

The two equal angles face the two sides with ticks.



L

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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: *L D M Q G J F P*.
2. **Say this once:** *“The two sides with ticks are equal. The two angles opposite those sides are equal. Find them before you do any arithmetic. Eight right answers bring you back to your first card.”*
3. **Each group finds the angle, then walks to the card with that number at the top.** Nothing else is needed.

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 the two facts of the lesson as two small drawings.
Answers	pages 12–13, for you only. Do not put them up in the room.

Every card shows one triangle with two equal sides, marked with ticks. The triangle rests on one of the two equal sides, so the two equal angles are *not* the two angles at the bottom. One angle is given and one is asked. On four ring cards the given angle is where the two equal sides meet, so the student takes it from 180° and halves the rest. On the other four, the given angle is one of the equal pair, so the student doubles it and takes that from 180° . Only the ticks say which card is which.

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. The most common mistake is to take the two angles at the bottom of the page as the equal pair. On every ring card, that mistake gives the number at the top of one of the eight other cards. The group does that card, and its answer sends the group back to the card it got wrong. If the group makes the same mistake there, it goes one more card back and still does not reach the ring.

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 small type under the question. It tells a group that arrived by a wrong answer what to check. A group that arrived by a right answer skips it. If a group keeps coming back to the same cards, do not give the answer. Ask: *“Put a finger on each side with a tick. Which angle is across from it?”*



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

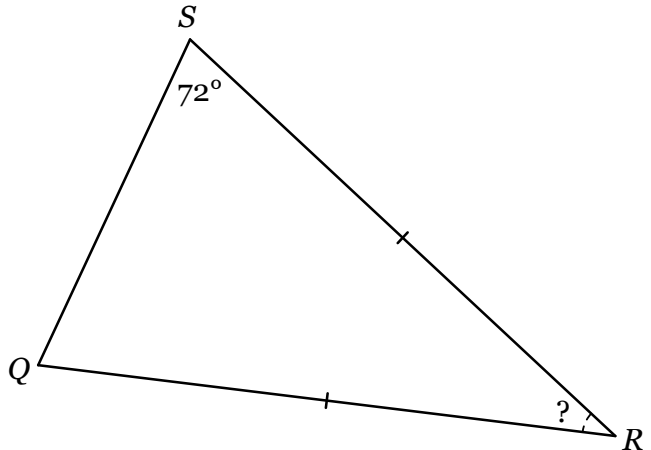
116°

Two sides have ticks. They are equal.

$$m\angle S = 72^\circ$$

What is $m\angle R$?

The triangle can rest on any side. The equal angles are not always at the bottom.



A

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ANSWER

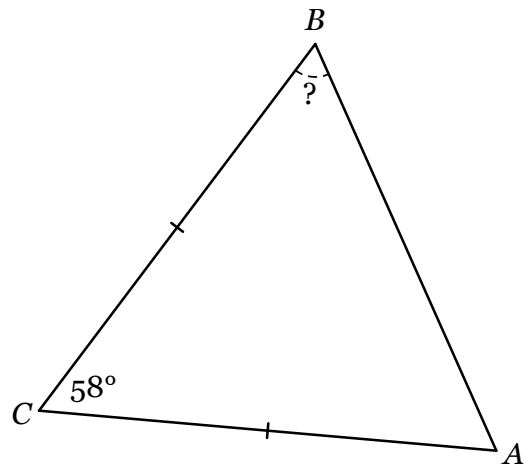
54°

Two sides have ticks. They are equal.

$$m\angle C = 58^\circ$$

What is $m\angle B$?

Look at the ticks first, then at the numbers.



B

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ANSWER

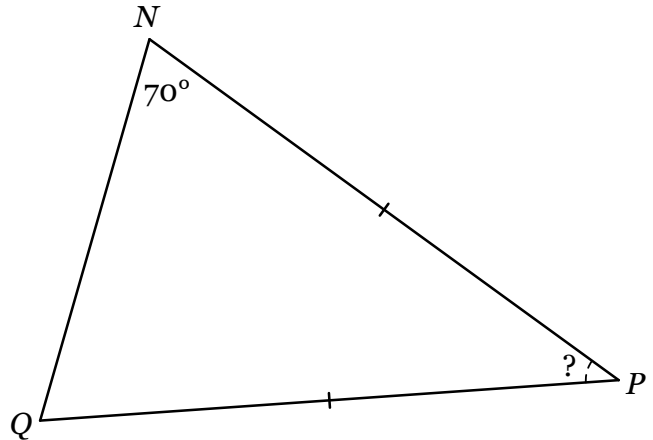
64°

Two sides have ticks. They are equal.

$$m\angle N = 70^\circ$$

What is $m\angle P$?

What is left after the odd angle? Split it into two equal parts.



C

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ANSWER

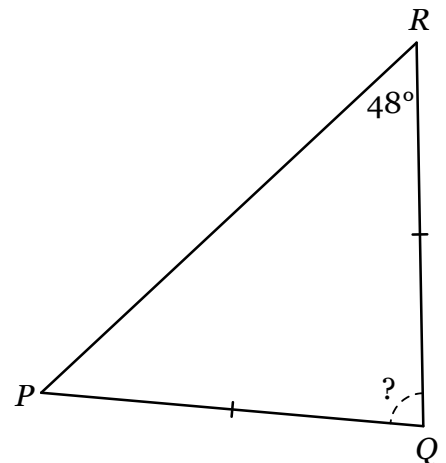
74°

Two sides have ticks. They are equal.

$$m\angle R = 48^\circ$$

What is $m\angle Q$?

Find the corner where the two sides with ticks meet. Its angle is the odd one.



D

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ANSWER

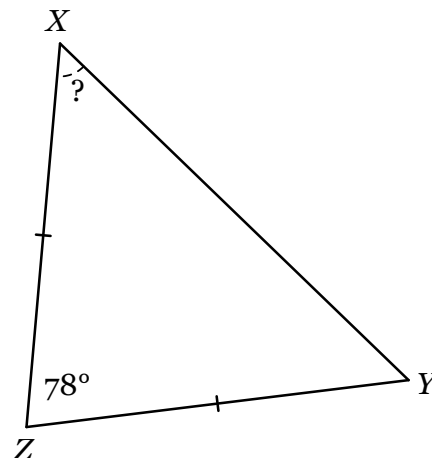
55°

Two sides have ticks. They are equal.

$$m\angle Z = 78^\circ$$

What is $m\angle X$?

Halve what is left only when the known angle is the odd one.



E

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ANSWER

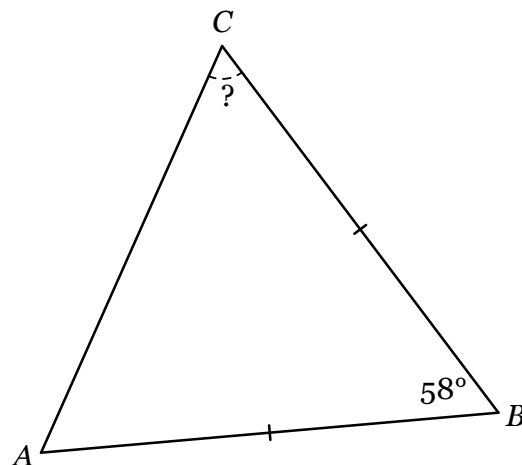
40°

Two sides have ticks. They are equal.

$$m\angle B = 58^\circ$$

What is $m\angle C$?

Is the known angle one of the equal pair, or the odd one?



F

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ANSWER

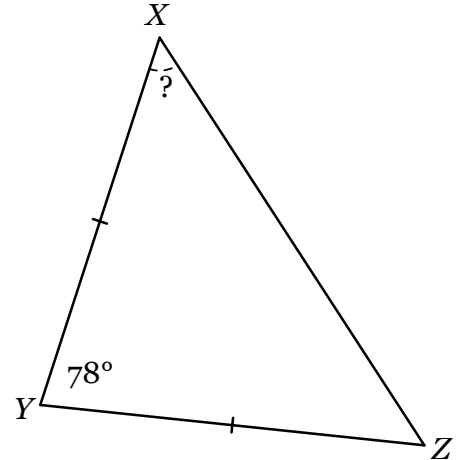
68°

Two sides have ticks. They are equal.

$$m\angle Y = 78^\circ$$

What is $m\angle X$?

Put a finger on a side with ticks. The angle across from it is one of the pair.



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G

ANSWER

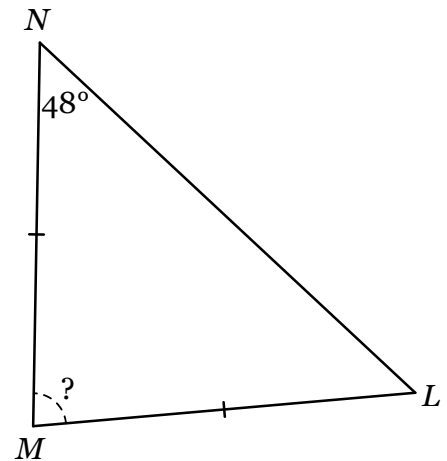
80°

Two sides have ticks. They are equal.

$$m\angle N = 48^\circ$$

What is $m\angle M$?

Two sides with ticks are equal. So are the two angles across from them.



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H

ANSWER

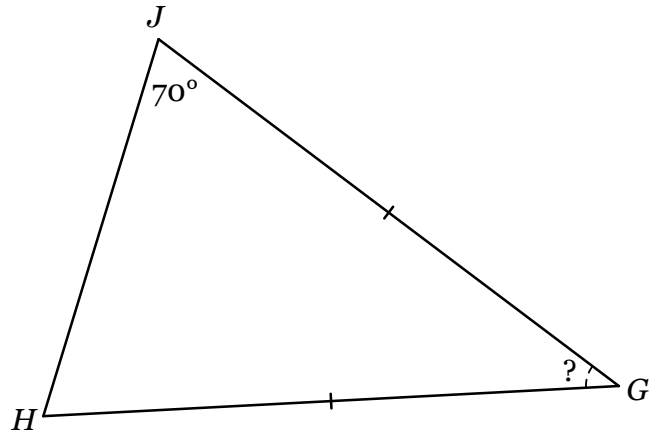
51°

Two sides have ticks. They are equal.

$$m\angle J = 70^\circ$$

What is $m\angle G$?

The three angles of a triangle add to 180° .



J

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ANSWER

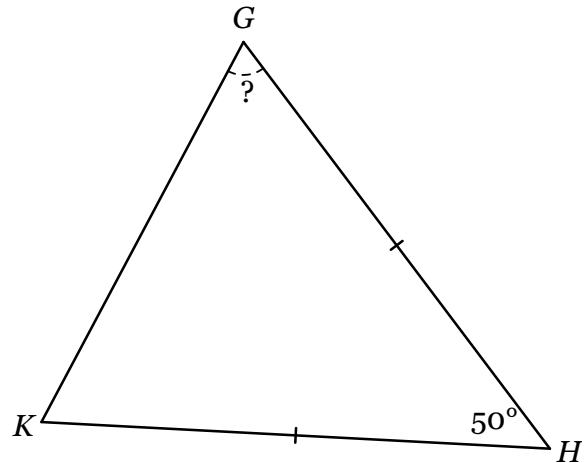
62°

Two sides have ticks. They are equal.

$$m\angle H = 50^\circ$$

What is $m\angle G$?

Add your three angles. Do they make 180° ?



K

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ANSWER

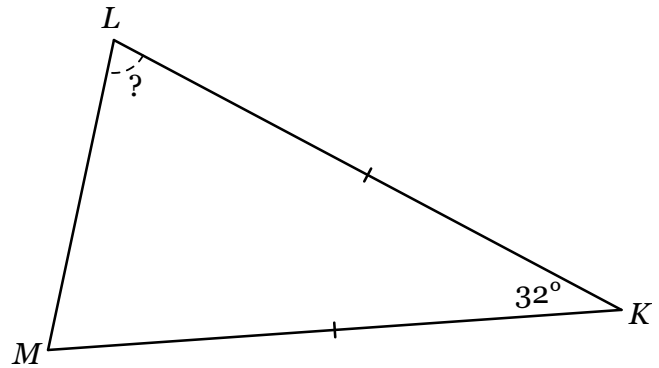
36°

Two sides have ticks. They are equal.

$$m\angle K = 32^\circ$$

What is $m\angle L$?

The two equal angles face the two sides with ticks.



L

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ANSWER

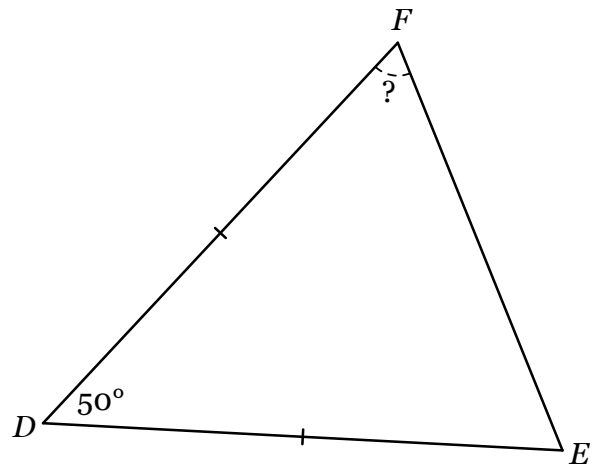
84°

Two sides have ticks. They are equal.

$$m\angle D = 50^\circ$$

What is $m\angle F$?

Do not trust the bottom of the page. Trust the ticks.



M

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ANSWER

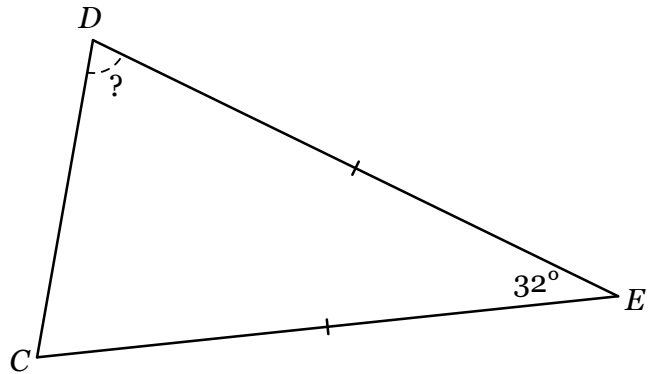
66°

Two sides have ticks. They are equal.

$$m\angle E = 32^\circ$$

What is $m\angle D$?

Which corner joins the two sides with ticks? Its angle is the odd one.



N

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ANSWER

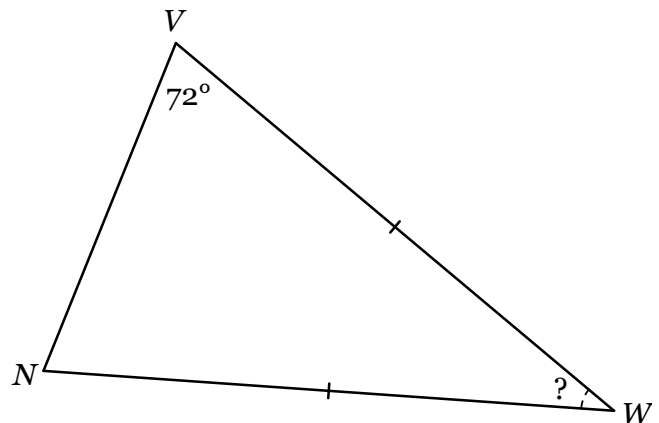
61°

Two sides have ticks. They are equal.

$$m\angle V = 72^\circ$$

What is $m\angle W$?

Check your answer. Two angles match, and all three add to 180° .



P

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ANSWER

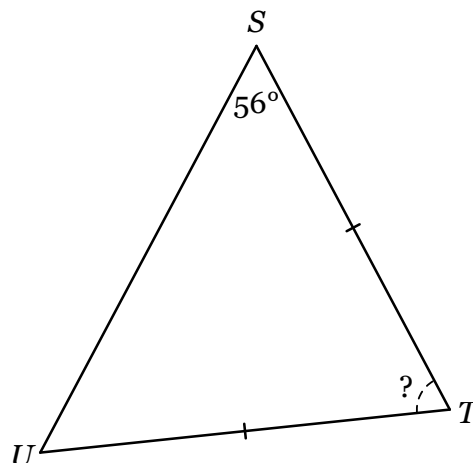
65°

Two sides have ticks. They are equal.

$$m\angle S = 56^\circ$$

What is $m\angle T$?

Which angle is across from each side with a tick?



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Q

ANSWER

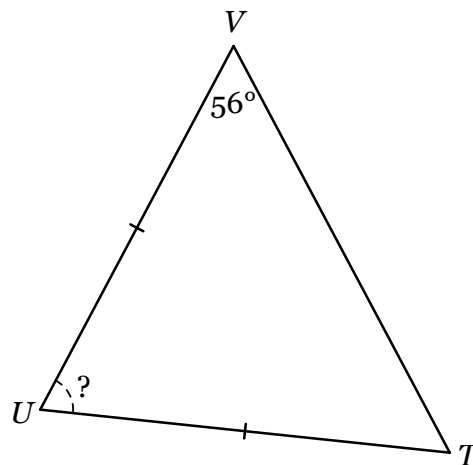
24°

Two sides have ticks. They are equal.

$$m\angle V = 56^\circ$$

What is $m\angle U$?

Cover the corner where the ticks meet. The other two angles match.



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R

Scavenger Hunt — where I went

Isosceles and equilateral triangles

Name _____

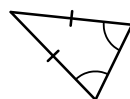
Period _____

Date _____

Do the card you are at. Fill in one line. Then find the card with your answer at the top. **First find the two equal angles. They are opposite the two sides with ticks.** A clean run is eight lines. Each card has a line in small type under the question. **If you are on a card because you went wrong, its line says what to check. If you were right, skip it.**



Two sides are equal. So the two angles **opposite** them are equal.



Two angles are equal. So the two sides **opposite** them are equal.

Sides with the same number of ticks are equal. Angles with the same number of arcs are equal.

Card letter	The two equal angles are at	My answer
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Why does an isosceles triangle walk so well?

Every number stands for a letter. Write the letter for each of your answers in the box above that number. Leave the other boxes empty. Then read the boxes you filled, left to right. **If they do not spell a word, one answer is wrong.**

24° = G 36° = E 40° = V 51° = E 54° = E 55° = N 61° = N 62° = S 64° = E 65° = L 66° = V 68° = E 74° = G
80° = L 84° = S 116° = E

24°	36°	40°	51°	54°	55°	61°	62°	64°	65°	66°	68°	74°	80°	84°	116°



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Scavenger Hunt — answers

For the teacher

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

L → D → M → Q → G → J → F → P → L

Why does an isosceles triangle walk so well? The answer is *EVEN LEGS*. The ring's answers, in the order of the boxes on the record sheet (smallest number first), with their letters: **36° E • 40° V • 51° E • 61° N • 65° L • 68° E • 74° G • 84° S**.

	Card	Given and asked	Answer, and why	Wrong answer from taking the bottom two angles as equal	Joke letter for the number at its top
1	L	$m\angle K = 32^\circ$, find $m\angle L$	74° . KL and KM have ticks, so the angles opposite them, $\angle L$ and $\angle M$, are equal. $180 - 32 = 148$, and half of that is 74.	116°, from taking $\angle K$ and $\angle M$, the two angles at the bottom, as the equal pair	E
2	D	$m\angle R = 48^\circ$, find $m\angle Q$	84° . QP and QR have ticks, so the angles opposite them, $\angle P$ and $\angle R$, are equal. So $m\angle P$ is also 48° , and $180 - 48 - 48 = 84$.	66°, from taking $\angle Q$ and $\angle P$, the two angles at the bottom, as the equal pair	G
3	M	$m\angle D = 50^\circ$, find $m\angle F$	65° . DE and DF have ticks, so the angles opposite them, $\angle E$ and $\angle F$, are equal. $180 - 50 = 130$, and half of that is 65.	80°, from taking $\angle D$ and $\angle E$, the two angles at the bottom, as the equal pair	S
4	Q	$m\angle S = 56^\circ$, find $m\angle T$	68° . TS and TU have ticks, so the angles opposite them, $\angle S$ and $\angle U$, are equal. So $m\angle U$ is also 56° , and $180 - 56 - 56 = 68$.	62°, from taking $\angle T$ and $\angle U$, the two angles at the bottom, as the equal pair	L
5	G	$m\angle Y = 78^\circ$, find $m\angle X$	51° . YX and YZ have ticks, so the angles opposite them, $\angle X$ and $\angle Z$, are equal. $180 - 78 = 102$, and half of that is 51.	24°, from taking $\angle Y$ and $\angle Z$, the two angles at the bottom, as the equal pair	E
6	J	$m\angle J = 70^\circ$, find $m\angle G$	40° . GH and GJ have ticks, so the angles opposite them, $\angle H$ and $\angle J$, are equal. So $m\angle H$ is also 70° , and $180 - 70 - 70 = 40$.	55°, from taking $\angle G$ and $\angle H$, the two angles at the bottom, as the equal pair	E
7	F	$m\angle B = 58^\circ$, find $m\angle C$	61° . BA and BC have ticks, so the angles opposite them, $\angle A$ and $\angle C$, are equal. $180 - 58 = 122$, and half of that is 61.	64°, from taking $\angle B$ and $\angle A$, the two angles at the bottom, as the equal pair	V
8	P	$m\angle V = 72^\circ$, find $m\angle W$	36° . WV and WN have ticks, so the angles opposite them, $\angle V$ and $\angle N$, are equal. So $m\angle N$ is also 72° , and $180 - 72 - 72 = 36$.	54°, from taking $\angle W$ and $\angle N$, the two angles at the bottom, as the equal pair	N

Each wrong answer in the table is the number at the top of a card off the ring. Those cards are on the next page.

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 back to the card it got wrong. If the group takes the bottom two angles as equal again, it goes to another card off the ring. So a second wrong answer never moves a group forward.

Card	Given and asked	Answer, and why	Wrong answer from taking the bottom two angles as equal	Joke letter for the number at its top
A	$m\angle S = 72^\circ$, find $m\angle R$	36° . RQ and RS have ticks, so the angles opposite them, $\angle Q$ and $\angle S$, are equal. So $m\angle Q$ is also 72° , and $180 - 72 - 72 = 36$.	54° , from taking $\angle R$ and $\angle Q$, the two angles at the bottom, as the equal pair	E
N	$m\angle E = 32^\circ$, find $m\angle D$	74° . EC and ED have ticks, so the angles opposite them, $\angle C$ and $\angle D$, are equal. $180 - 32 = 148$, and half of that is 74.	116° , from taking $\angle E$ and $\angle C$, the two angles at the bottom, as the equal pair	V
H	$m\angle N = 48^\circ$, find $m\angle M$	84° . MN and ML have ticks, so the angles opposite them, $\angle N$ and $\angle L$, are equal. So $m\angle L$ is also 48° , and $180 - 48 - 48 = 84$.	66° , from taking $\angle M$ and $\angle L$, the two angles at the bottom, as the equal pair	L
K	$m\angle H = 50^\circ$, find $m\angle G$	65° . HG and HK have ticks, so the angles opposite them, $\angle G$ and $\angle K$, are equal. $180 - 50 = 130$, and half of that is 65.	80° , from taking $\angle H$ and $\angle K$, the two angles at the bottom, as the equal pair	S
R	$m\angle V = 56^\circ$, find $m\angle U$	68° . UT and UV have ticks, so the angles opposite them, $\angle T$ and $\angle V$, are equal. So $m\angle T$ is also 56° , and $180 - 56 - 56 = 68$.	62° , from taking $\angle U$ and $\angle T$, the two angles at the bottom, as the equal pair	G
E	$m\angle Z = 78^\circ$, find $m\angle X$	51° . ZY and ZX have ticks, so the angles opposite them, $\angle Y$ and $\angle X$, are equal. $180 - 78 = 102$, and half of that is 51.	24° , from taking $\angle Z$ and $\angle Y$, the two angles at the bottom, as the equal pair	N
C	$m\angle N = 70^\circ$, find $m\angle P$	40° . PN and PQ have ticks, so the angles opposite them, $\angle N$ and $\angle Q$, are equal. So $m\angle Q$ is also 70° , and $180 - 70 - 70 = 40$.	55° , from taking $\angle P$ and $\angle Q$, the two angles at the bottom, as the equal pair	E
B	$m\angle C = 58^\circ$, find $m\angle B$	61° . CB and CA have ticks, so the angles opposite them, $\angle B$ and $\angle A$, are equal. $180 - 58 = 122$, and half of that is 61.	64° , from taking $\angle C$ and $\angle A$, the two angles at the bottom, as the equal pair	E

Other mistakes lead to no ring card. A group might take the given angle from 180° and forget to halve or to double. Or it might copy the given angle. Its answer is then not the number at the top of any ring card.

Guessing does not work. Every simple rule that uses only the printed number, such as always halving what is left after 180° , answers at most eight of the sixteen cards correctly.