

SCAVENGER HUNT



MEASURING AND CLASSIFYING ANGLES

Reading a Protractor: Which Scale?

Estimate first, then read · two scales, one right answer · the cards check the answers

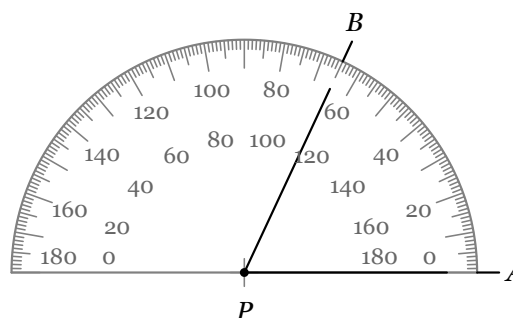
FREE

ANSWER

155°

Find $m\angle APB$.

Estimate first: is the opening more or less than a square corner?



H

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1. **Tape the 16 cards around the room**, in any order. Send each group to a *different* card. **Start each group on one of these eight cards:** *H L R G P A M D*. A ruler per group.
2. **Say this once:** “*Before you read a number, decide if it is more or less than a square corner. Then count from the O that the flat arm lies on. After eight lines, you are back where you started.*”
3. **Read the angle. Then find the card with that number at the top.**

16 cards	pages 3–10, one copy. There are two cards on each sheet. Cut the stack once, through the middle.
Record sheet	page 11, one per student.
Answers	pages 12–13. These are for you. Do not put them up in the room.

What every card asks. Each card shows the lesson's protractor with one arm along the flat edge and the other arm crossing the scale. The group gives the measure of the angle. Where the arm crosses, two numbers are printed, one on each scale, and they add to 180. **Reading the wrong scale is the most common mistake, and the whole hunt is built on it.** The way to avoid it is to estimate first, so the record sheet asks *more or less than 90°?* before the number. Half the answers on the loop are acute and half are obtuse. Half the cards have the flat arm on the right-hand O, and half on the left. So every simple guessing rule, such as always taking the smaller number, gets at most eight of the 16 cards right. Three cards have an arm too short to reach the scale. The group extends it with a ruler, because the sides of an angle are rays.

Eight of the 16 cards form a closed loop. The other eight are where a wrong answer goes. They look like every other card. A group that reads the other scale finds its number at the top of one of these cards. It does that card, and the answer sends it back to the card it got wrong. If it goes wrong there too, it goes one more card back, never forward.

The check is the length of their row. A clean run is **eight lines**. Every wrong answer adds two more. Under “Find ...” on every card is a line that says what to check. A group that arrived with a wrong answer uses it to check the card it came from. A group that arrived with a right answer can skip it. These lines are written the same way on every card, so they never tell a group that it went wrong. If a group keeps going in circles, do not give the answer. Ask: “*Was that opening more or less than a square corner?*”



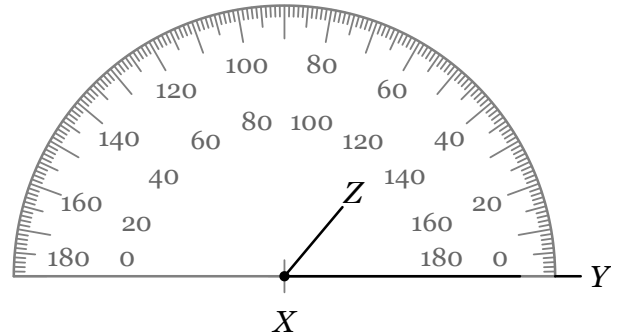
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ANSWER

125°

Find $m\angle YXZ$.

Extend a short arm with a ruler
before you read anything.



A

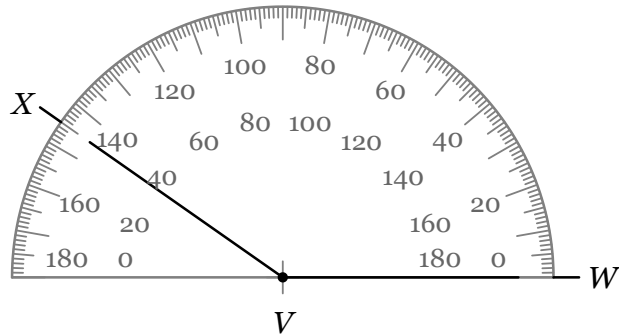
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ANSWER

150°

Find $m\angle WVX$.

Once a short arm is extended, is the
opening wider than a square corner?



B

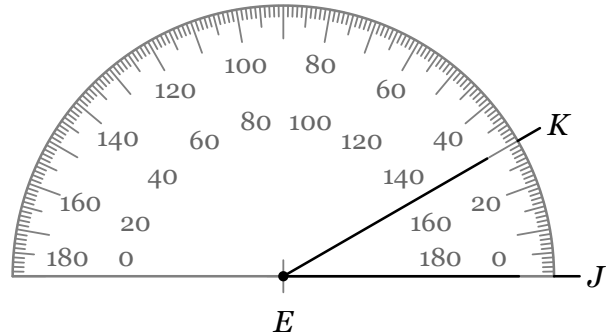
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ANSWER

70°

Find $m\angle JEK$.

An opening wider than a square corner has a measure over 90.



C

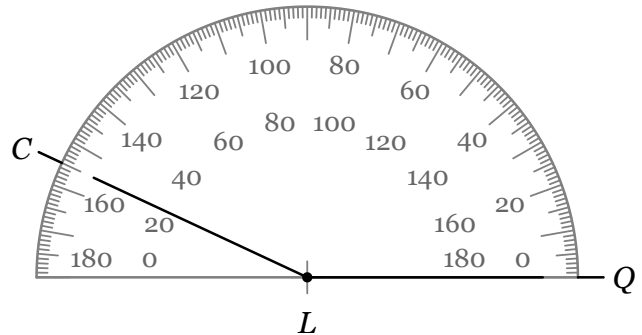
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ANSWER

75°

Find $m\angle QLC$.

Say “more than 90” or “less than 90” out loud before you read.



D

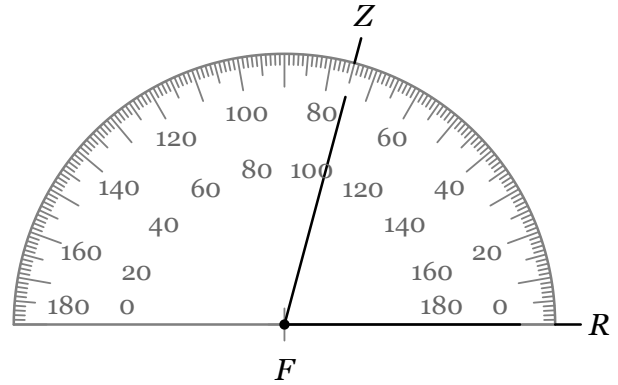
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ANSWER

25°

Find $m\angle RFZ$.

An opening almost flat is close to 180. Which of the two numbers says so?



E

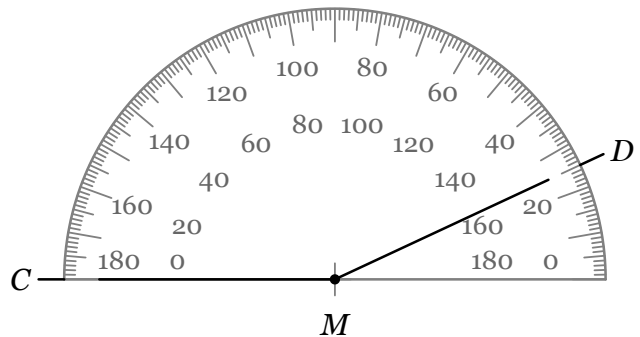
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ANSWER

115°

Find $m\angle CMD$.

A sharp opening has a measure under 90. Which scale agrees?



F

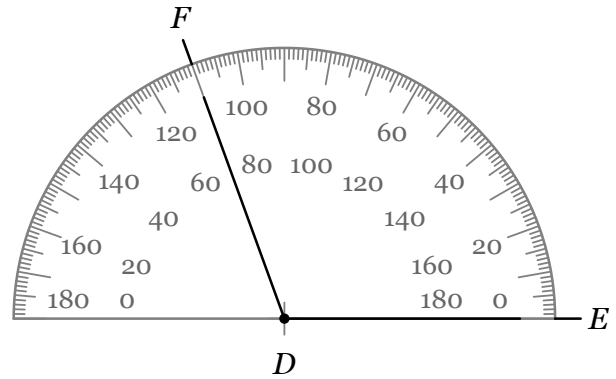
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ANSWER

30°

Find $m\angle EDF$.

Two numbers stand where the arm crosses. Only one of them is the angle.



G

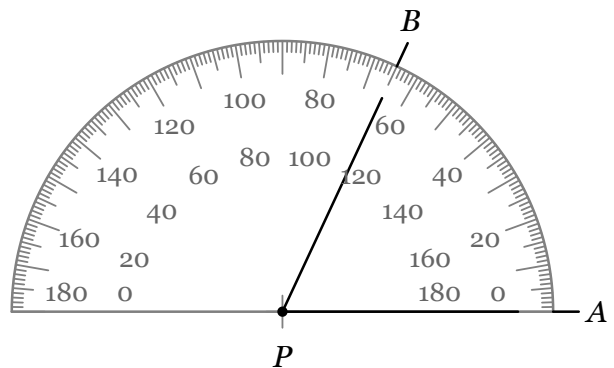
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ANSWER

155°

Find $m\angle APB$.

Estimate first: is the opening more or less than a square corner?



H

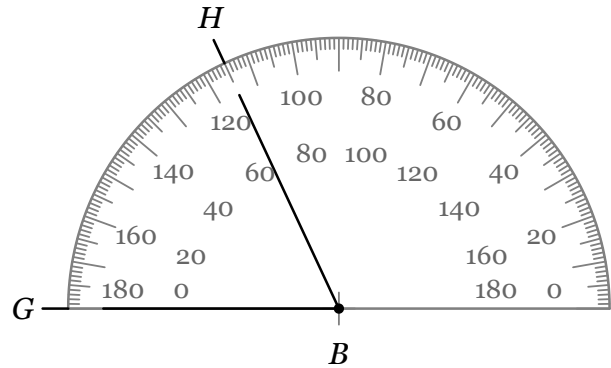
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ANSWER

35°

Find $m\angle GBH$.

Which end of the flat edge is the flat arm on? Count up from the 0 at that end.



J

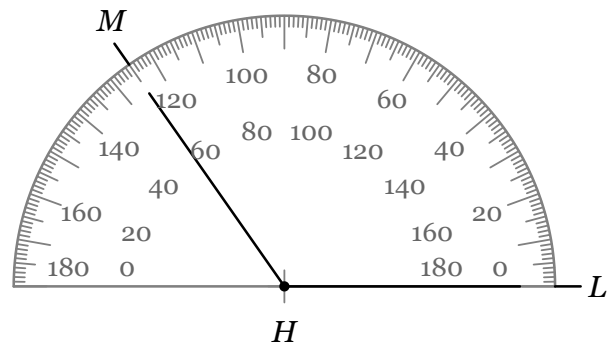
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ANSWER

130°

Find $m\angle LHM$.

An opening narrower than a square corner has a measure under 90.



K

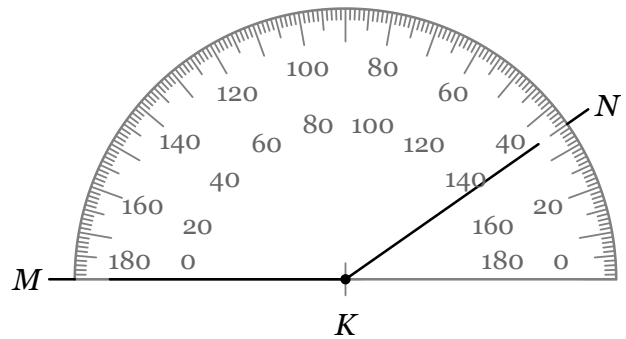
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ANSWER

65°

Find $m\angle MKN$.

Count from the 0 under the flat arm.



L

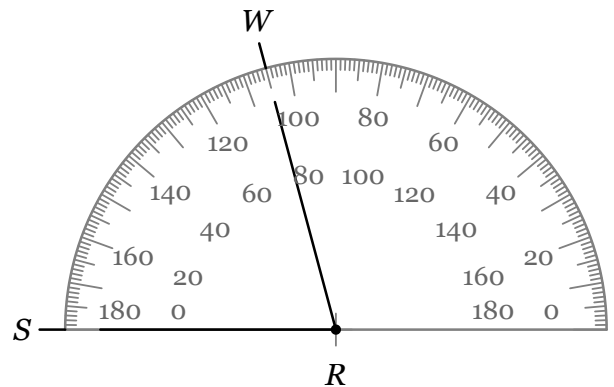
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ANSWER

50°

Find $m\angle SRW$.

Follow the scale from its 0 round to the arm. Does it count up the whole way?



M

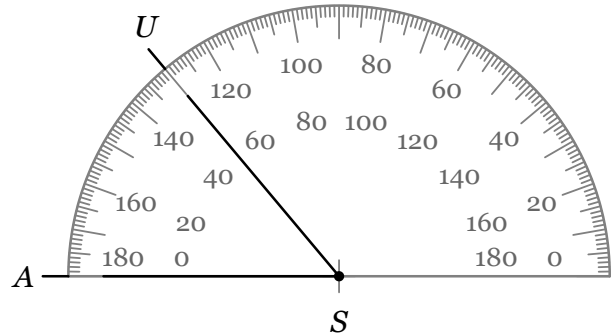
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ANSWER

105°

Find $m\angle ASU$.

More or less than a square corner?
Read the scale that agrees.



N

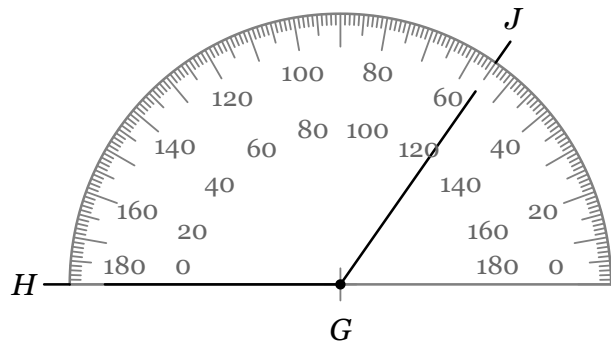
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ANSWER

110°

Find $m\angle HGJ$.

Wider than a square corner means
more than 90.



P

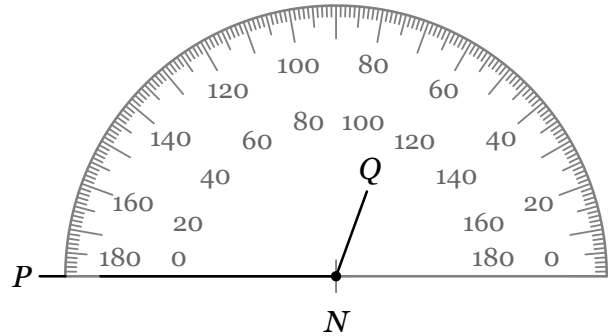
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ANSWER

55°

Find $m\angle PNQ$.

The scale to read is the one whose 0 is under the flat arm.



Q

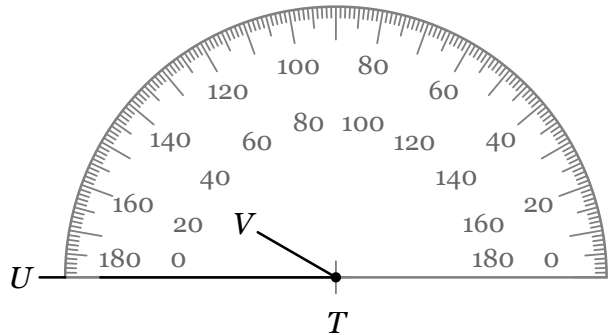
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ANSWER

145°

Find $m\angle UTV$.

If an arm stops short, lay a ruler along it first. The sides of an angle are rays.



R

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Scavenger Hunt — where I went

Reading a protractor

Name _____ Period _____ Date _____

At each card, **first write whether the angle is more or less than a square corner (90°)**. Then read the protractor. Count from the 0 the flat arm lies on. Write your answer. Find the card with that number at the top. A clean run is eight lines. A longer row means one answer was wrong. **If you are on a card because you went wrong, the line under “Find ...” says what to check on the card you came from. If you were right, skip it.**

Card letter	More or less than 90° ? (before you read)	My answer
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Everybody said the 89° angle was a right angle. It looked so square. What did the protractor say?

Every number stands for a letter. Write the letter for each answer in the box above that number. Leave the other boxes empty. Then read the boxes you filled across. **If it does not spell two words, one answer was wrong.**

25 = N 30 = A 35 = E 50 = C 55 = O 65 = U 70 = C 75 = T 105 = E 110 = E 115 = T 125 = O 130 = U 145 = N
150 = A 155 = E

25	30	35	50	55	65	70	75	105	110	115	125	130	145	150	155



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Scavenger Hunt — answers

For the teacher

This is the loop, in order. A group may start anywhere on it. Wherever it starts, eight right answers bring it back to that card.

H → L → R → G → P → A → M → D → H

Everybody said the 89° angle was a right angle. It looked so square. What did the protractor say? *ACUTE ONE*. Students read it in the boxes of the record sheet, from the smallest number to the largest.

The answers on the loop, smallest first: $30^\circ = A$, $50^\circ = C$, $65^\circ = U$, $75^\circ = T$, $110^\circ = E$, $125^\circ = O$, $145^\circ = N$, $155^\circ = E$. That spells ACUTE ONE.

	Card	Angle, and which scale to read	Numbers where the arm crosses	Answer	Wrong answer (other scale)	Letter for the joke
1	H	$m\angle APB$. The flat arm is on the right-hand o, so read the outer scale.	outer 65, inner 115	65°	115°	E
2	L	$m\angle MKN$. The flat arm is on the left-hand o, so read the inner scale.	outer 35, inner 145	145°	35°	U
3	R	$m\angle UTV$. The flat arm is on the left-hand o, so read the inner scale. One arm is short. Extend it.	outer 150, inner 30	30°	150°	N
4	G	$m\angle EDF$. The flat arm is on the right-hand o, so read the outer scale.	outer 110, inner 70	110°	70°	A
5	P	$m\angle HGJ$. The flat arm is on the left-hand o, so read the inner scale.	outer 55, inner 125	125°	55°	E
6	A	$m\angle YXZ$. The flat arm is on the right-hand o, so read the outer scale. One arm is short. Extend it.	outer 50, inner 130	50°	130°	O
7	M	$m\angle SRW$. The flat arm is on the left-hand o, so read the inner scale.	outer 105, inner 75	75°	105°	C
8	D	$m\angle QLC$. The flat arm is on the right-hand o, so read the outer scale.	outer 155, inner 25	155°	25°	T

Each wrong answer is the number at the top of a card off the loop. Those cards are on the next page. Every wrong answer is the reading on the other scale.

Scavenger Hunt — the cards off the loop

For the teacher

These eight cards are where a wrong answer goes. The number at the top of each one is the wrong answer to one card of the loop. Its own answer is the number at the top of that loop card. So a group that lands here goes back to the card it got wrong, and its row gets two lines longer. **A group cannot reach one of these cards with a right answer.** Reading the other scale on one of these cards gives the number at the top of the card just before it in this list. So going wrong twice sends a group one card further back, never forward.

Card	Angle, and which scale to read	Numbers where the arm crosses	Answer	Wrong answer (other scale)	Letter for the joke
F	$m\angle CMD$. The flat arm is on the left-hand o, so read the inner scale.	outer 25, inner 155	155°	25°	T
J	$m\angle GBH$. The flat arm is on the left-hand o, so read the inner scale.	outer 115, inner 65	65°	115°	E
B	$m\angle WVX$. The flat arm is on the right-hand o, so read the outer scale.	outer 145, inner 35	145°	35°	A
C	$m\angle JEK$. The flat arm is on the right-hand o, so read the outer scale.	outer 30, inner 150	30°	150°	C
Q	$m\angle PNQ$. The flat arm is on the left-hand o, so read the inner scale. One arm is short. Extend it.	outer 70, inner 110	110°	70°	O
K	$m\angle LHM$. The flat arm is on the right-hand o, so read the outer scale.	outer 125, inner 55	125°	55°	U
N	$m\angle ASU$. The flat arm is on the left-hand o, so read the inner scale.	outer 130, inner 50	50°	130°	E
E	$m\angle RFZ$. The flat arm is on the right-hand o, so read the outer scale.	outer 75, inner 105	75°	105°	N

The line under “Find ...” on every card is a check, not an answer. Every card has one, in the same place and written the same way. Short arms, and flat arms on either side, appear both on the loop and off it. No number at the top of any card is printed on the protractor. The protractor is numbered every twenty degrees, and every answer falls between two of those numbers.