

SCAVENGER HUNT



DISTANCE FROM A POINT TO A LINE

Which Segment Is the Distance?

12 cards · a full class period · no numbers anywhere

FREE

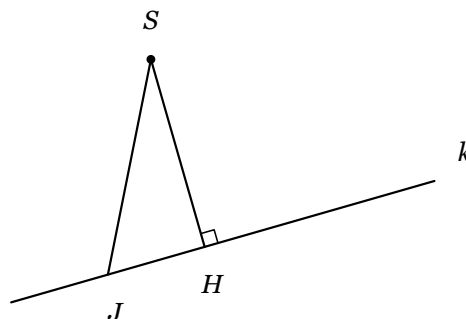
ANSWER

RF

Two segments are drawn from S to line k .

Which one is the **distance from S to k** ?

Follow each segment to its end before you choose between them.



A

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1. **Tape the 16 cards round the room**, in any order. Send each group to a *different* card.
2. **Say this once:** *“Three segments, one right-angle mark. The one with the mark is the only one that is the distance. It will be the shortest of the three.”*
3. **Name the segment. Find the card with that name at the top.** You are finished when you get back to the card you started at. Do not use a ruler. There is not a number in the room.

16 cards	pages 3–10, one copy. Two to a sheet — one cut through the stack.
Record sheet	page 11, one per student.
Answers	pages 12–13 — yours. They do not go in the room.

eight of the 16 cards make the ring, and the other eight are where a wrong answer goes. They do not look any different: a name at the top, a figure, a question and one line, like every other card. A group that names the segment without the little square names something that is **at the top of one of those cards** — they walk to it, do the card standing there, and its answer sends them back to the one they got wrong.

The check is the length of their row, and it is the only one you need. A clean run is **eight lines**; every wrong answer costs exactly two more and none can cost fewer. *Count the rows.*

And a group can settle it themselves before they walk. The distance is the *shorter* of the two segments drawn from the point, so a finger or a strip of paper refutes a wrong answer without giving a right one — which is what makes it a check and not a key. It is on the record sheet.

Where they will go wrong, and what to ask. On a card whose second segment looks shortest, or on one of the two cards whose middle end is ticked as a midpoint. The segment to a midpoint is the single commonest wrong answer on this material — about a quarter of all responses — and those cards sit off the ring, where a group meets them just after taking a segment that was not the distance. Do not give the answer: ask *“which of yours has the little square on it?”*

Three cards ask for the distance between two parallel lines rather than from a point to a line. It is the same segment and the same mark; the transversal that crosses both is right there and is not it.

Cards stay on the wall — say so, because one student will take one down.



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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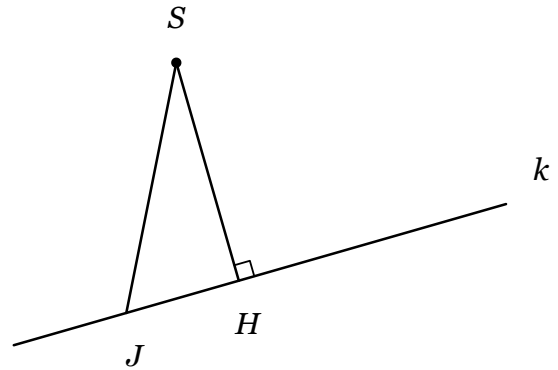
ANSWER

RF

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A

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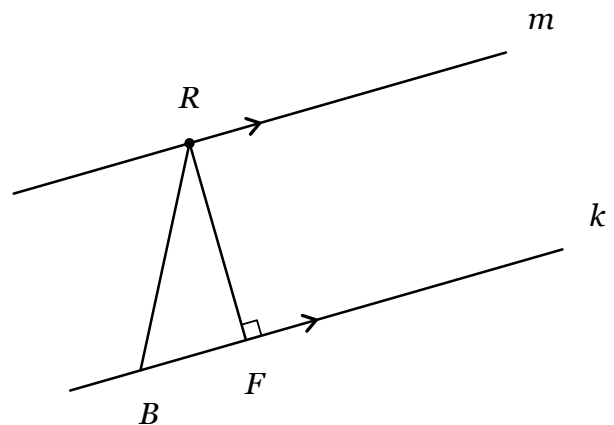
ANSWER

SJ

Lines m and k are parallel, and R is on m .

Which segment's length is the **distance between m and k** ?

A transversal between two parallel lines is not the distance between them.



B

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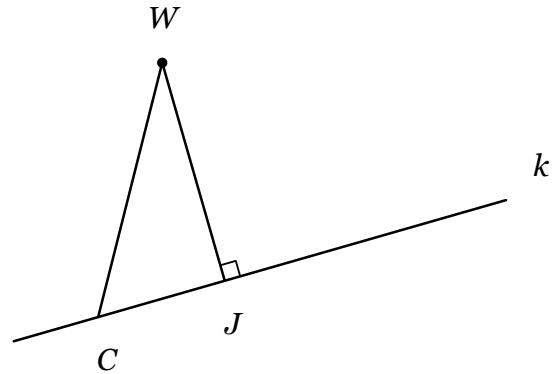
ANSWER

PB

Two segments are drawn from W to line k .

Which one is the **distance from W to k** ?

A segment that does not carry the little square is not the distance, however short it looks.



C

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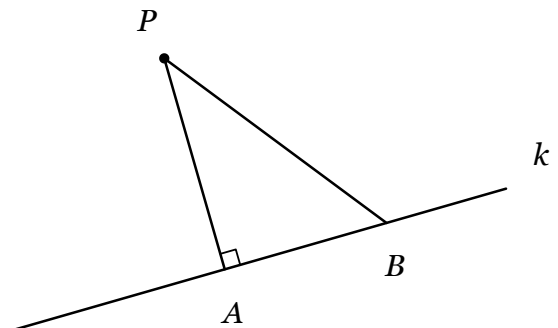
ANSWER

WJ

Two segments are drawn from P to line k .

Which one is the **distance from P to k** ?

Two segments, one question: which of them stops on the line and is perpendicular to it?



D

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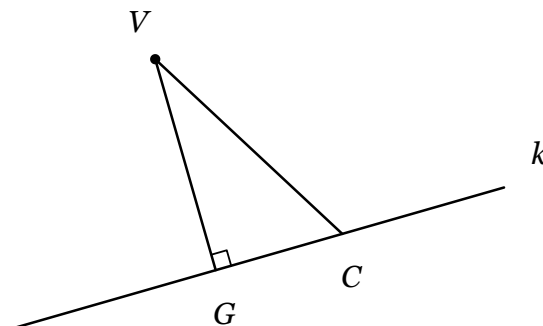
ANSWER

WA

Two segments are drawn from V to line k .

Which one is the **distance from V to k** ?

Two ends on the line, one right-angle mark: the mark chooses, not the eye.



E

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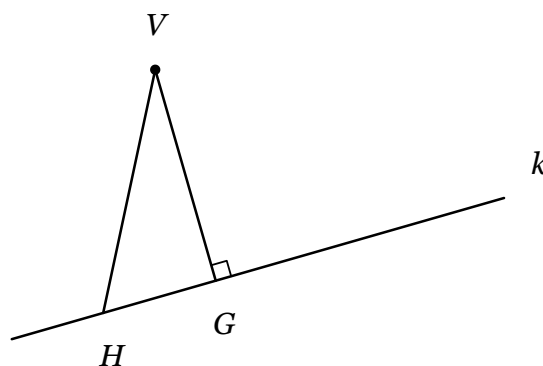
ANSWER

UE

Two segments are drawn from V to line k .

Which one is the **distance from V to k** ?

Name the segment by its two ends: the point first, then where it lands.



F

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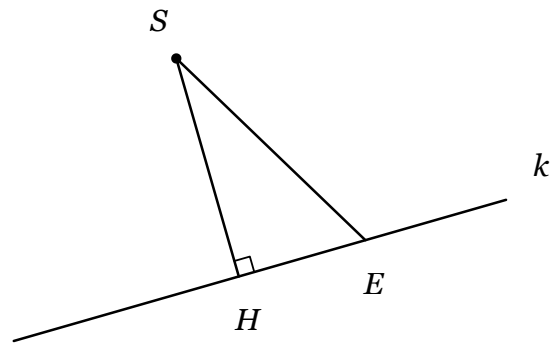
ANSWER

TC

Two segments are drawn from S to line k .

Which one is the **distance from S to k** ?

Look for the little square first, and only then at how long the segment looks.



G

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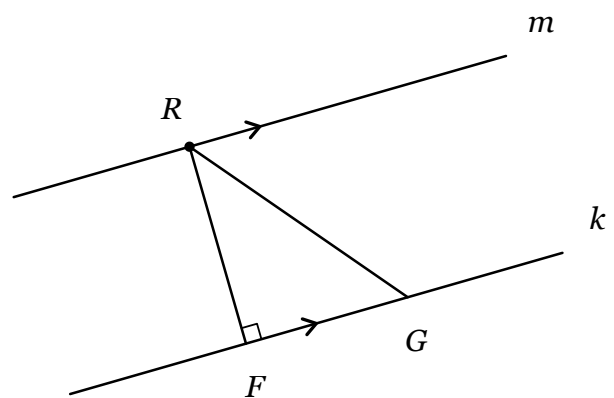
ANSWER

QC

Lines m and k are parallel, and R is on m .

Which segment's length is the **distance between m and k** ?

Between two parallel lines the distance is still the one with the little square.



H

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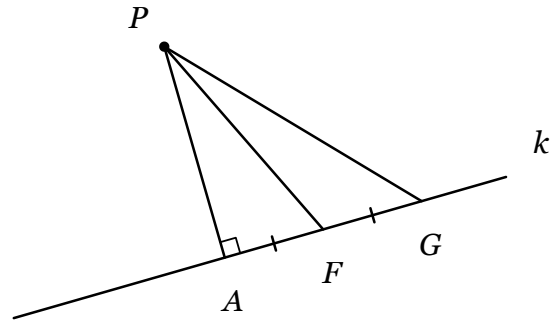
ANSWER

QE

Three segments are drawn from P to line k .

Which one is the **distance from P to k** ?

The middle of a marked stretch is not the foot of a perpendicular.



J

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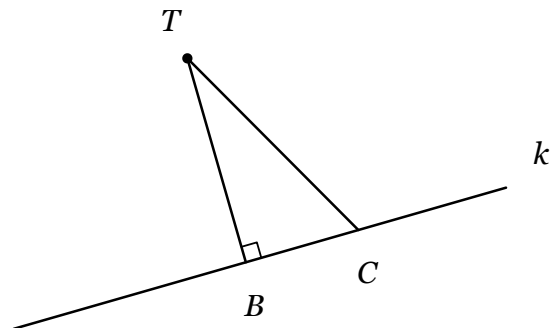
ANSWER

SH

Two segments are drawn from T to line k .

Which one is the **distance from T to k** ?

A slant drawn from the point to the line says nothing on its own.



K

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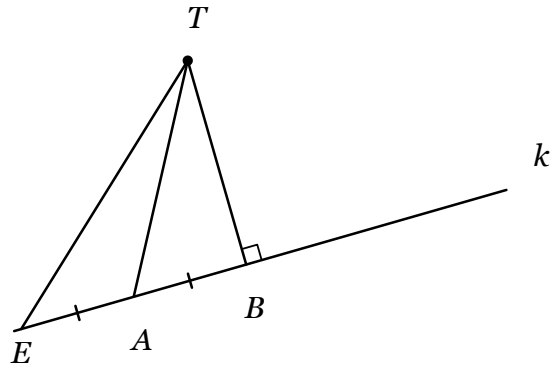
ANSWER

UF

Three segments are drawn from T to line k .

Which one is the **distance from T to k** ?

Ticks say two lengths are equal. They say nothing about a right angle.



L

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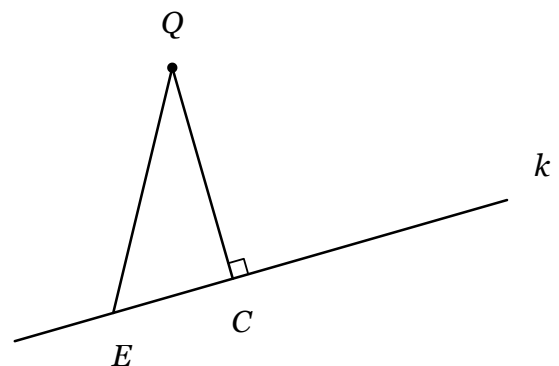
ANSWER

PA

Two segments are drawn from Q to line k .

Which one is the **distance from Q to k** ?

The little square is the only thing that says a segment is perpendicular to the line.



M

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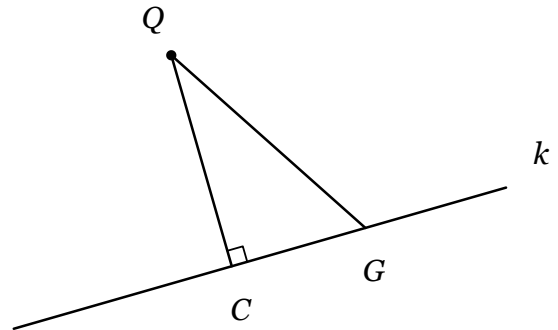
ANSWER

RG

Two segments are drawn from Q to line k .

Which one is the **distance from Q to k** ?

Perpendicular to the line, and stopping on it: both, or it is not the distance.



N

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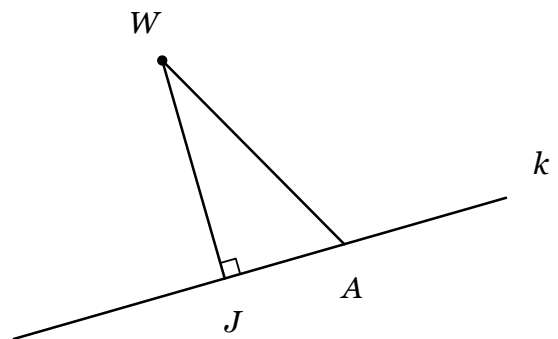
ANSWER

VG

Two segments are drawn from W to line k .

Which one is the **distance from W to k** ?

Of the two, the distance is the shorter.
That is a check you can run yourself.



P

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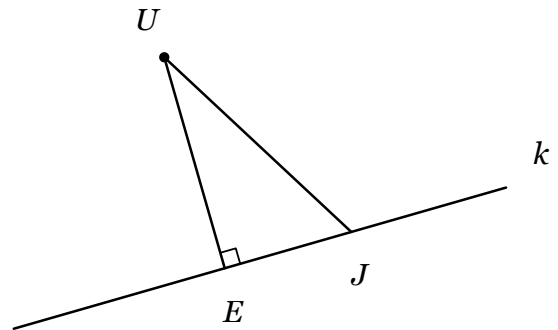
ANSWER

VH

Two segments are drawn from U to line k .

Which one is the **distance from U to k** ?

The distance is the shortest way from the point to the line, and it is perpendicular to it.



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Q

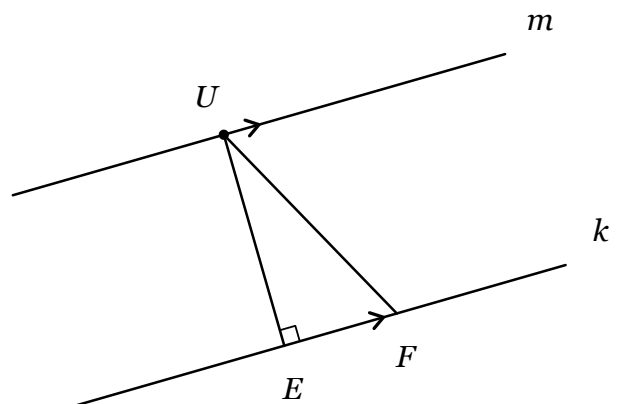
ANSWER

TB

Lines m and k are parallel, and U is on m .

Which segment's length is the **distance between m and k** ?

Ask which line the question names before you look at either segment.



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R

Scavenger Hunt — where I went

Which segment is the distance?

Name _____

Period _____

Date _____

At each card, write the card's letter and the two letters naming the segment that is the distance. Then find the card with *your* two letters at the top. **The one you want carries the right-angle mark and stops on the line.** A clean run is eight lines. A longer row means one answer was wrong. The line at the foot of the card you land on says which.

Check yourself before you walk: the distance is the shorter one. If the other is shorter than the one you chose, yours is wrong.

Card letter	My segment	How I knew
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Every other way from the point to the line is longer. So what is this one?

Every segment name stands for a letter. Write the letter for each of your answers in the box under that name. Leave the other boxes empty. Then read the boxes you filled, from left to right. **If it does not spell a word, one answer was wrong.**

PA = S PB = D QC = H QE = M RF = O RG = K SH = R SJ = N TB = T TC = W UE = E UF = Y VG = S VH = L
WA = U WJ = T

PA	PB	QC	QE	RF	RG	SH	SJ	TB	TC	UE	UF	VG	VH	WA	WJ



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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. The eight cards that are not on it are on the next page, and a group can only reach one of them by going wrong.

D → M → H → A → K → R → F → P → D

Every other way from the point to the line is longer. So what is this one? *SHORTEST*. The boxes on the record sheet are in alphabetical order of the segment names.

The answers on the ring, in that order: PA = S, QC = H, RF = O, SH = R, TB = T, UE = E, VG = S, WJ = T, which spells SHORTEST.

	Card	The distance	What else is drawn, and why it is not	Letter
1	D	PA	PB <i>it is drawn and it is not square to k</i>	S
2	M	QC	QE <i>it is drawn and it is not square to k</i>	H
3	H	RF	RG <i>the other crosses from m to k and is square to neither</i>	O
4	A	SH	SJ <i>it is drawn and it is not square to k</i>	R
5	K	TB	TC <i>it is drawn and it is not square to k</i>	T
6	R	UE	UF <i>the other crosses from m to k and is square to neither</i>	E
7	F	VG	VH <i>it is drawn and it is not square to k</i>	S
8	P	WJ	WA <i>it is drawn and it is not square to k</i>	T

Every name a group can write down is at the top of exactly one card. So a group cannot choose between two names by looking for the one on the wall. The cards on the next page are where the wrong names lead.

And the answer is always the shorter one. That is the theorem, it is printed on the record sheet, and it is how a group refutes its own wrong answer without asking anybody.

Scavenger Hunt — the cards that are not on the ring

For the teacher

These eight cards are where a wrong answer goes. Each carries the name a group writes down by taking the wrong segment at one card of the ring, and **each draws the same point and the same perpendicular as the card that sent them there** — with a different segment beside it. So the group does that perpendicular again in other company, and its answer sends them back to the card they got wrong; their row comes out two lines longer than a clean run. **A group cannot arrive at one of these by being right.**

Card	The distance	What else is drawn, and why it is not	Letter
B	RF	RB <i>the other crosses from m to k and is square to neither</i>	O
C	WJ	WC <i>it is drawn and it is not square to k</i>	T
E	VG	VC <i>it is drawn and it is not square to k</i>	S
G	SH	SE <i>it is drawn and it is not square to k</i>	R
J	PA	PF, PG <i>PF runs to the ticked midpoint, and neither is square to k</i>	S
L	TB	TA, TE <i>TA runs to the ticked midpoint, and neither is square to k</i>	T
N	QC	QG <i>it is drawn and it is not square to k</i>	H
Q	UE	UJ <i>it is drawn and it is not square to k</i>	E

Both cards whose middle end is ticked as a midpoint are here, and that is deliberate: the segment to a midpoint is the commonest wrong answer on this material — about a quarter of all responses — and a group now meets it immediately after taking a segment that was not the distance. **The line at the foot of each of these cards names the mistake**, and every card in the room carries a line in the same place, so nothing on a student's page says which cards these are.