

ANSWER MAZE



DISTANCE FROM A POINT TO A LINE

Which Segment Is the Distance?

One page · 10–15 minutes · nothing to prepare

FREE

1 Which one is the distance from P to k ?

$PF \rightarrow$ go to 6
 $PA \rightarrow$ go to 8

Only one of the two can be the distance. Which of them carries the little square?

2 Which one is the distance from P to k ?

$PT \rightarrow$ go to 5
 $PH \rightarrow$ go to 7

Follow each segment to its end: does it stop on k , or somewhere else?

3 Which one is the distance from P to k ?

$PS \rightarrow$ go to 5
 $PC \rightarrow$ you are out

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

4 Which one is the distance from P to k ?

$PG \rightarrow$ go to 2
 $PM \rightarrow$ go to 8

A right-angle mark is the only thing on the page that says a segment is perpendicular to k .

1. **Hand out page 3.** That is the whole preparation. Do not use a ruler. There is not a number on the sheet.
2. **Say this once:** *“Two segments, one question. Which one starts at the point, stops on the line, and carries the right-angle mark at that line?”*
3. **Start at step 1.** Choose a segment. Go where it sends you. You are out after six boxes. **Write every box number in the row at the foot as you go.**

Student sheet page 3, one per student. Nothing to cut, nothing to set up.
Answers page 4.

The route is 1 → 6 → 4 → 2 → 7 → 3 → out. Boxes 5 and 8 are not on it: they are where a wrong answer goes. **They do not look any different, and that is deliberate** — a drawing, a question, two segments, two destinations and a hint, like every other box, and both of their branches lead back on to the route. Nothing a student can read says which two they are.

Every wrong option is a mistake students really make, and the most common is the midpoint. On one step a stretch of the line has its midpoint marked, and the segment to that midpoint is offered. About a quarter of students choose a segment like it, and printing the definition beside it helps very little. What helps is a figure where the segment to the midpoint is *clearly* not the shortest, and that step is drawn that way.

The other five are: the slanted segment that was simply there; the one that is square to the line and runs past it; the one that stops short of it; the transversal between two parallels; and — the subtle one — a perfectly correct perpendicular dropped on to the *other* line. That last is not a failure of perpendicularity at all; it is a dodge, and it appears only when the honest answer is awkward. Six different figures on six steps, so nothing is answered by recognising the last one.

What the row at the foot tells you in one glance, and it is the whole check. A sheet whose row reads 1 → 6 → 4 → 2 → 7 → 3 is right. **A clean run is six numbers**, and every wrong turn makes the row longer, never shorter: no box can put a student further along the route than the step after the one they left. Any longer row shows the exact box where it went wrong.



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 Maze

Start at step 1 · nothing here is a number

Name _____

Period _____

Date _____

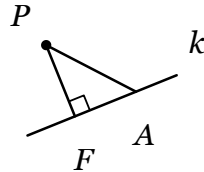
The distance stops on the line k . It carries the right-angle mark against k . Nothing here is measured. A clean run is six numbers in the row below. A longer row means a wrong turn. It shows where.

1

Which one is the distance from P to k ?

$PF \rightarrow$ go to 6
 $PA \rightarrow$ go to 8

Only one of the two can be the distance. Which of them carries the little square?

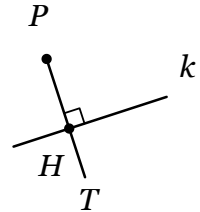


2

Which one is the distance from P to k ?

$PT \rightarrow$ go to 5
 $PH \rightarrow$ go to 7

Follow each segment to its end: does it stop on k , or somewhere else?

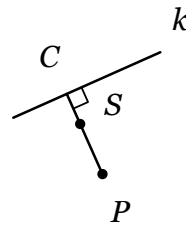


3

Which one is the distance from P to k ?

$PS \rightarrow$ go to 5
 $PC \rightarrow$ you are out

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

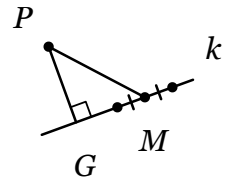


4

Which one is the distance from P to k ?

$PG \rightarrow$ go to 2
 $PM \rightarrow$ go to 8

A right-angle mark is the only thing on the page that says a segment is perpendicular to k .

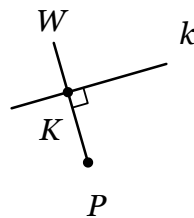


5

Which one is the distance from P to k ?

$PW \rightarrow$ go to 2
 $PK \rightarrow$ go to 7

The distance has to stop exactly on k . It does not run past k , and it does not stop short of it.

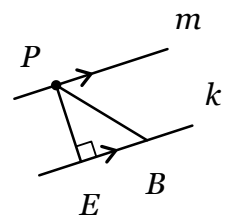


6

$m \parallel k$. Which is the distance between them?

$PB \rightarrow$ go to 8
 $PE \rightarrow$ go to 4

Between two parallel lines the distance is still the segment with the little square on it.

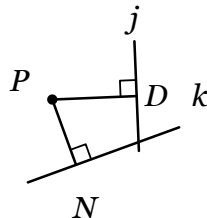


7

Which one is the distance from P to k ?

$PN \rightarrow$ go to 3
 $PD \rightarrow$ go to 8

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

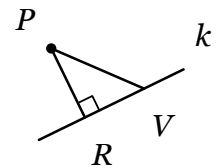


8

Which one is the distance from P to k ?

$PV \rightarrow$ go to 1
 $PR \rightarrow$ go to 6

A segment is perpendicular to k only if a little square says so. A slant drawn to the line says nothing.



Write every box number here as you go. It shows you the way back if you get lost. Your teacher reads this row too.

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The route, in order. Boxes 5 and 8 are off the route and are on nobody's correct run: they carry a drawing and a task like every other box, and both of their branches lead back on to the route. **Every box carries a hint of the same shape in the same place**, so nothing on the student's page says which two they are.

1 → 6 → 4 → 2 → 7 → 3 → out

	Step	The distance is	The mistake it catches	Sends them to
1	Step 1	PF	took the slanted segment that was already drawn <i>the other option, PA, goes to step 8</i>	step 6
2	Step 6	PE	took the transversal, because it was there and the perpendicular was not <i>the other option, PB, goes to step 8</i>	step 4
3	Step 4	PG	took the segment to the midpoint of the marked stretch <i>the other option, PM, goes to step 8</i>	step 2
4	Step 2	PH	took the one that is square to k and runs on past it <i>the other option, PT, goes to step 5</i>	step 7
5	Step 7	PN	dropped a correct perpendicular on to the other line, j, instead of on to k <i>the other option, PD, goes to step 8</i>	step 3
6	Step 3	PC	took the one that points at k and stops before it <i>the other option, PS, goes to step 5</i>	out

Why every box on the sheet looks like every other one. On a maze where two boxes print no destination, “never take the branch that points at the box with nothing under it” walks the whole sheet and no geometry is done at all — which is what every maze of this unit did before it was rebuilt. Here every box carries a drawing, a question, two segments, two destinations and a hint, so being sent somewhere that looks ordinary is no evidence of having been right; the row at the foot is what tells a student, and a wrong turn always makes it longer.

The check a student can run with nobody around, and its one limit. Every segment that really runs from the point *to the line* is longer than the perpendicular, so on the steps where both options end on *k* the right answer is the shorter one and a student can settle it with a finger. That is asserted here, step by step. **It does not work on the step whose wrong option stops short of the line** — that stroke is shorter than the distance and is not a segment to the line at all, which is exactly why “shortest” is a check on candidates and not a definition on its own. It is worth two minutes at the end.