

ANSWER MAZE



THE PERPENDICULAR BISECTOR THEOREM

The Perpendicular Bisector — which half of the theorem?

One page · 10–15 minutes · nothing to prepare

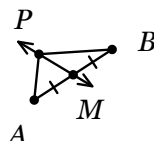
FREE

1

What do the marks let you say?

neither — a condition is missing → **go to 7**
the **line** is given: so $PA = PB$ → **go to 4**

Read what the figure gives you before you read what it is asking for.

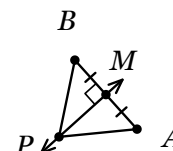


2

What do the marks let you say?

neither — a condition is missing → **go to 6**
the **line** is given: so $PA = PB$ → **you are out**

A line is longer than the ink that draws it, and the theorem reaches every point of it.

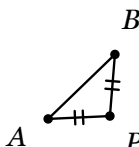


3

What do the marks let you say?

the **distances** are given: so P is on the line → **go to 5**
the **line** is given: so $PA = PB$ → **go to 6**

Two equal distances marked and a line marked are not the same given.

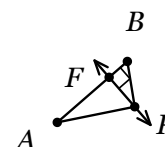


4

What do the marks let you say?

the **line** is given: so $PA = PB$ → **go to 1**
neither — a condition is missing → **go to 7**

A perpendicular bisector needs both marks: midpoint and right angle. Which is here, and which is missing?

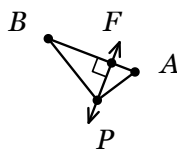


5

What do the marks let you say?

the **line** is given: so $PA = PB$ → **go to 4**
neither — a condition is missing → **go to 8**

One mark is one mark. Count them before naming anything.

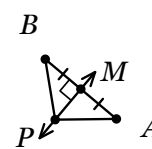


6

What do the marks let you say?

the **distances** are given: so P is on the line → **go to 7**
the **line** is given: so $PA = PB$ → **go to 3**

What does the figure hand you: the line, or the two equal distances? The other one is what follows.



1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“Ask what the figure gives you: the line, or the two distances. It may give one of them, or neither. That is the whole question.”*
3. **Start at step 1.** Read the marks. Choose the answer. Go where it sends you. A clean run is six steps, then out. **Write every step number in the row at the foot as you go.**

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

The route is 1 → 7 → 3 → 5 → 8 → 2 → out. Boxes 4 and 6 are not on it. They are where a wrong answer goes. **They look like every other box:** a figure, a question, two answers, two destinations and a hint. Both of their answers lead back to the route. Four different steps send a wrong answer to box 6. Nothing on the sheet shows students which two boxes are off the route.

Each answer names what the figure gives. The answer “so $PA = PB$ ” on its own would also be true of a figure that already marks PA and PB equal. Then two answers would be right. Naming what is given makes exactly one answer right for each figure. On three of the eight steps, the answer is “neither.” One condition is marked and the other is not. The wrong answer there is what a student concludes by treating that one mark as the whole definition.

Guessing does not get a student out. Every simple guessing rule, such as always taking the top answer, goes wrong within the first two boxes.

The row of numbers at the foot is your check. A clean run is six numbers long. A wrong turn always makes the row longer, never shorter.



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 — what do the marks let you say?

Start at step 1

Name _____

Period _____

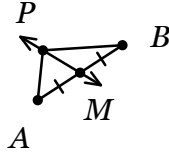
Date _____

What do the marks let you say?

1

neither — a condition is missing → **go to 7**
the **line** is given: so $PA = PB$ → **go to 4**

Read what the figure gives you before you read what it is asking for.

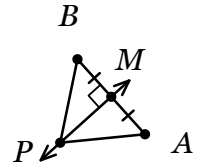


What do the marks let you say?

2

neither — a condition is missing → **go to 6**
the **line** is given: so $PA = PB$ → **you are out**

A line is longer than the ink that draws it, and the theorem reaches every point of it.

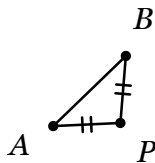


What do the marks let you say?

3

the **distances** are given: so P is on the line → **go to 5**
the **line** is given: so $PA = PB$ → **go to 6**

Two equal distances marked and a line marked are not the same given.

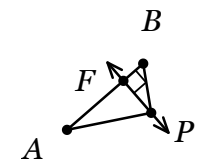


What do the marks let you say?

4

the **line** is given: so $PA = PB$ → **go to 1**
neither — a condition is missing → **go to 7**

A perpendicular bisector needs both marks: midpoint and right angle. Which is here, and which is missing?

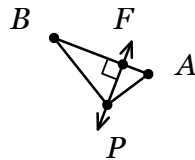


What do the marks let you say?

5

the **line** is given: so $PA = PB$ → **go to 4**
neither — a condition is missing → **go to 8**

One mark is one mark. Count them before naming anything.

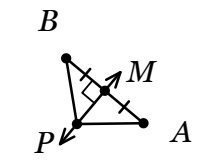


What do the marks let you say?

6

the **distances** are given: so P is on the line → **go to 7**
the **line** is given: so $PA = PB$ → **go to 3**

What does the figure hand you: the line, or the two equal distances? The other one is what follows.

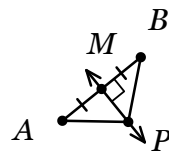


What do the marks let you say?

7

the **distances** are given: so P is on the line → **go to 6**
the **line** is given: so $PA = PB$ → **go to 3**

Which of the two is the given here, and which is the thing that follows from it?

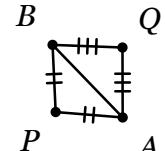


What do the marks let you say?

8

the **distances** are given: so P is on the line → **go to 2**
neither — a condition is missing → **go to 6**

A figure can give you the two distances without drawing any line at all.



Write every box number here as you go. It shows you the way back if you get lost. A clean run is six numbers.

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Answer Maze — answers

For the teacher

The route is **1 → 7 → 3 → 5 → 8 → 2 → out**. The student's row of numbers is all you need to mark. Steps 4 and 6 are off the route, so a clean row does not include them.

Step	Answer, and why it is right	Right answer goes to	Wrong answer, and the mistake behind it
1	Neither. A condition is missing. The line goes through the ticked midpoint, but no right angle is marked. So it may not be the perpendicular bisector.	go to 7	The line is given, so $PA = PB$. The mistake is treating a line through the midpoint as the perpendicular bisector. Goes to 4.
2	The line is given, so $PA = PB$. The ticks mark the midpoint of AB , and the square marks a right angle. So the line is the perpendicular bisector, and P is on it. P is far out along the line, but the theorem holds on the whole line.	out	Neither. A condition is missing. The mistake is thinking the theorem stops where the drawn line stops. Goes to 6.
3	The distances are given, so P is on the line. The ticks show $PA = PB$, and no line is drawn. A point the same distance from A and B is on the perpendicular bisector.	go to 5	The line is given, so $PA = PB$. The mistake is starting from the line when the figure gives the two distances and no line. Goes to 6.
4	Neither. A condition is missing. The square marks a right angle, but nothing marks the midpoint. So the line may not be the perpendicular bisector.	go to 7	The line is given, so $PA = PB$. The mistake is treating a line perpendicular to AB as the perpendicular bisector. Goes to 1.
5	Neither. A condition is missing. The square marks a right angle, but nothing marks the midpoint. So the line may not be the perpendicular bisector.	go to 8	The line is given, so $PA = PB$. The mistake is treating a line perpendicular to AB as the perpendicular bisector. Goes to 4.
6	The line is given, so $PA = PB$. The ticks mark the midpoint of AB , and the square marks a right angle. So the line is the perpendicular bisector, and P is on it.	go to 3	The distances are given, so P is on the line. The mistake is starting from the two distances when the figure gives the line. Goes to 7.
7	The line is given, so $PA = PB$. The ticks mark the midpoint of AB , and the square marks a right angle. So the line is the perpendicular bisector, and P is on it.	go to 3	The distances are given, so P is on the line. The mistake is starting from the two distances when the figure gives the line. Goes to 6.
8	The distances are given, so P is on the line. The ticks show that P and Q are each the same distance from A as from B . So both are on the perpendicular bisector, even though no line is drawn.	go to 2	Neither. A condition is missing. The mistake is thinking nothing can be said because no line is drawn. Goes to 6.

Do not use triangle congruence or the isosceles triangle theorem to explain these answers. The class has not learned them yet at this point. Both directions of this theorem are proved with reflections, which the class has already met.