

ANSWER MAZE



PROPERTIES OF PARALLELOGRAMS

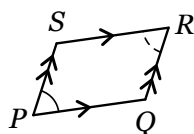
Across, Next Door, or Only Half?

One page · 10–15 minutes · nothing to prepare

FREE

4

$\angle P = 64^\circ$. How big is $\angle R$?



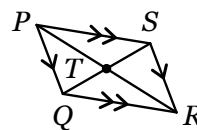
$\angle R = 116^\circ \rightarrow$ go to 2

$\angle R = 64^\circ \rightarrow$ go to 7

Put a finger on P and on R. Do they share a side?

7

$PT = 9$. How long is PR?



$PR = 18 \rightarrow$ go to 1

$PR = 9 \rightarrow$ go to 5

Where does PR start and stop? Is PT all of it?

1. **Hand out page 3**, one per student. Nothing else is needed.
2. **Say this once:** *“Start at box 4. For two angles, first ask: are they across from each other, or next to each other? For a diagonal, ask: is it a piece or the whole? Write every box number in the row at the bottom as you go.”*
3. **Check a sheet quickly.** A student with no mistakes writes **4 7 1 6 3 8**: six boxes, then out.

Student sheet	page 3, one per student. Each box has its own small drawing of the parallelogram PQRS. At the top, three small drawings show the three rules.
Answers	page 4.

Every wrong answer comes from one of two mistakes. The first is mixing up two kinds of angle pairs. In a parallelogram, angles across from each other (like $\angle P$ and $\angle R$) are equal. Angles next to each other (like $\angle P$ and $\angle Q$) add to 180° . Many students swap the two rules. In the boxes with x , the same mistake means setting the two expressions equal when they should add to 180, or the other way round. These wrong answers send the student to box 2.

The second mistake is about the diagonals. The point T where they cross cuts each diagonal into two equal pieces. Students give a piece when the whole diagonal is asked, give the value of x when a length is asked, or use a piece of the other diagonal. These wrong answers send the student to box 5. Boxes 2 and 5 ask the same kind of question again, and both of their answers lead back to the route.

The row at the bottom is the check. A clean run is six numbers. Each wrong answer adds at least one more. Guessing does not get a student out: every simple guessing rule, such as always taking the larger number, goes wrong within the first three boxes.



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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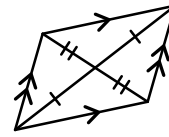
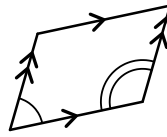
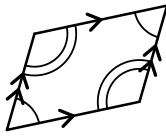
Answer Maze

Start at box 4 · properties of parallelograms

Name _____

Period _____

Date _____



Angles across from each other are equal.

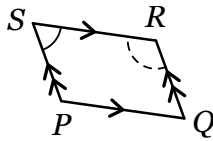
Two angles **next to each other** add to 180° .

The diagonals **cut each other in half**.

In every box, PQRS is a parallelogram and its diagonals cross at T. Arcs mark the angles in the question. A dashed arc is an angle to find. Choose an answer, and go to the box it names.

1

$\angle S = 62^\circ$. How big is $\angle R$?



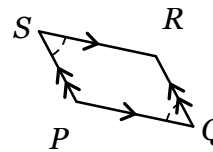
$\angle R = 62^\circ \rightarrow$ go to 2

$\angle R = 118^\circ \rightarrow$ go to 6

Find side SR. Where do the two angles sit on it?

2

$\angle S = (x + 20)^\circ$ and $\angle Q = (3x - 40)^\circ$. How big is $\angle S$?



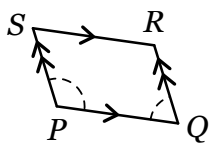
$\angle S = 50^\circ \rightarrow$ go to 7

$\angle S = 70^\circ \rightarrow$ go to 4

Does one side of the figure join the two corners?

3

$\angle P = (3x - 5)^\circ$ and $\angle Q = (x + 25)^\circ$. How big is $\angle P$?



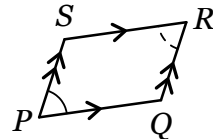
$\angle P = 40^\circ \rightarrow$ go to 2

$\angle P = 115^\circ \rightarrow$ go to 8

Are P and Q at the ends of one side, or across?

4

$\angle P = 64^\circ$. How big is $\angle R$?



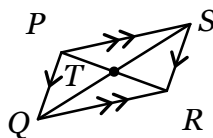
$\angle R = 116^\circ \rightarrow$ go to 2

$\angle R = 64^\circ \rightarrow$ go to 7

Put a finger on P and on R. Do they share a side?

5

QS = 16. How long is QT?



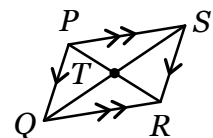
QT = 16 $\rightarrow$ go to 7

QT = 8 $\rightarrow$ go to 1

Is QT the whole diagonal, or one piece of it?

6

QT = $3x - 4$ and TS = $x + 6$. How long is QS?



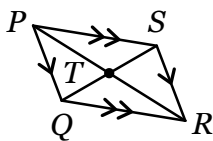
QS = 22 $\rightarrow$ go to 3

QS = 5 $\rightarrow$ go to 5

The question asks for a length. Where does x go next?

7

PT = 9. How long is PR?



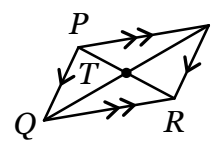
PR = 18 $\rightarrow$ go to 1

PR = 9 $\rightarrow$ go to 5

Where does PR start and stop? Is PT all of it?

8

PT = 4 and QT = 7. How long is TR?



TR = 4 $\rightarrow$ you are out

TR = 7 $\rightarrow$ go to 5

TR is a piece of which diagonal? Which piece is given?

Write each box number as you reach it:

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The route, in order. Boxes 2 and 5 are not on it. A student reaches them only by a wrong answer. They are the last two rows of the table.

4 → 7 → 1 → 6 → 3 → 8 → out

	Box	Right answer, and why	Wrong answer, and why a student picks it
1	Box 4 $\angle P = 64^\circ$. How big is $\angle R$?	$\angle R = 64^\circ$. $\angle P$ and $\angle R$ are across from each other, and opposite angles of a parallelogram are equal.	" $\angle R = 116^\circ$ " goes to box 2. A student who thinks angles across from each other add to 180° picks this.
2	Box 7 $PT = 9$. How long is PR ?	$PR = 18$. T is the middle of PR , so PR is twice PT : $2 \times 9 = 18$.	" $PR = 9$ " goes to box 5. A student who gives the piece PT instead of the whole diagonal picks this.
3	Box 1 $\angle S = 62^\circ$. How big is $\angle R$?	$\angle R = 118^\circ$. $\angle S$ and $\angle R$ are at the two ends of side SR , so they add to 180° : $180^\circ - 62^\circ = 118^\circ$.	" $\angle R = 62^\circ$ " goes to box 2. A student who thinks angles next to each other are equal picks this.
4	Box 6 $QT = 3x - 4$ and $TS = x + 6$. How long is QS ?	$QS = 22$. T cuts QS in half, so $3x - 4 = x + 6$. Then $x = 5$, $QT = 11$, and $QS = 2 \times 11 = 22$.	" $QS = 5$ " goes to box 5. A student who stops at $x = 5$ picks this. The question asks for the length QS .
5	Box 3 $\angle P = (3x - 5)^\circ$ and $\angle Q = (x + 25)^\circ$. How big is $\angle P$?	$\angle P = 115^\circ$. $\angle P$ and $\angle Q$ are next to each other, so they add to 180° : $(3x - 5) + (x + 25) = 180$, $x = 40$, and $\angle P = 115^\circ$.	" $\angle P = 40^\circ$ " goes to box 2. A student who sets the two angles equal picks this.
6	Box 8 $PT = 4$ and $QT = 7$. How long is TR ?	$TR = 4$. T cuts PR in half, so $TR = PT = 4$. QT is a piece of the other diagonal.	" $TR = 7$ " goes to box 5. A student who pairs TR with QT , a piece of the other diagonal, picks this.
	Box 2 $\angle S = (x + 20)^\circ$ and $\angle Q = (3x - 40)^\circ$. How big is $\angle S$?	$\angle S = 50^\circ$. $\angle S$ and $\angle Q$ are across from each other, so they are equal: $x + 20 = 3x - 40$, $x = 30$, and $\angle S = 50^\circ$.	" $\angle S = 70^\circ$ " goes to box 4. A student who adds the two angles to 180° picks this.
	Box 5 $QS = 16$. How long is QT ?	$QT = 8$. T is the middle of QS , so QT is half of QS : $16 \div 2 = 8$.	" $QT = 16$ " goes to box 7. A student who gives the whole diagonal instead of the piece QT picks this.

How to check any box. For two angles, put a finger on the two corners. If they share a side, the angles add to 180° . If they are across the figure from each other, the angles are equal. For a diagonal, find its two ends: T is its middle, so each piece is half of it. A piece of the other diagonal tells nothing about it.

A student can find the last four boxes of the route by following the arrows backward from "you are out." So ask a student with a clean row to explain one box.