

MYSTERY PICTURE

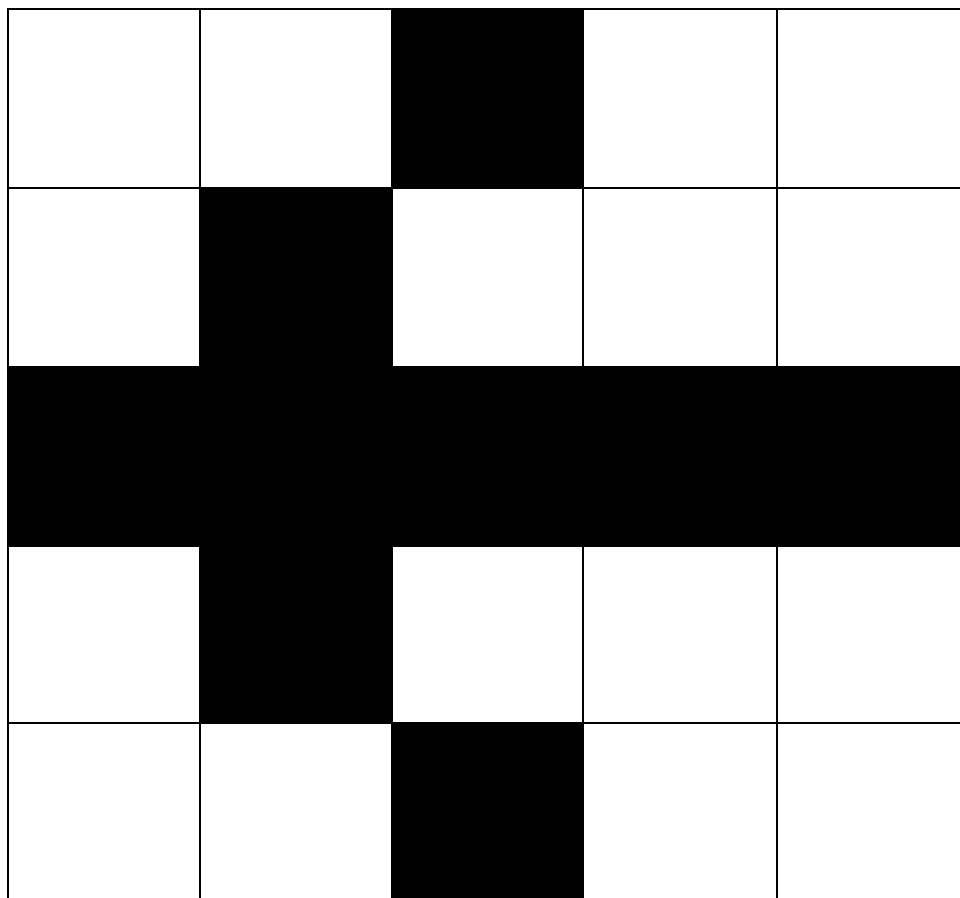


THE TRIANGLE MIDSEGMENT THEOREM

Is It Really a Midsegment?

25 triangles · midsegment or not?

FREE



1. **Hand out page 3**, one per student. Pencils. Nothing else is needed.
2. **Say this once:** *“A midsegment joins the midpoints of two sides. Check both ends of the segment. If both ends are midpoints, fill the square with slanted lines. If not, leave it white.”*
3. **When a student finishes, look at the picture.** If it is not a left arrow, a square is wrong. The student finds it and checks it again.

Student sheet	page 3, one per student. At the top it shows a midsegment, the midsegment theorem, and a segment that is not a midsegment, as three small drawings.
Answers	page 4: the finished picture and the reason for every square.

This sheet practices one question: is this segment a midsegment? A midsegment joins the midpoints of two sides of a triangle. So neither end is a corner, and each end is marked as a midpoint: the two halves of that side carry the same tick marks, or the words say it is a midpoint. Only then does the midsegment theorem apply.

Most squares are white, and each white square shows a common mistake. Three drawings and three sentences show a segment from a corner to a midpoint. That is a median, not a midsegment. Two drawings and one sentence show a segment that is exactly half as long as a side, but its ends are not midpoints. Many students think “half as long” makes a midsegment. It does not: the theorem only works in one direction. Four drawings show a segment that looks parallel to a side, but its ends are not marked as midpoints. Looking parallel is not a reason. In one drawing the tick marks pair a piece of one side with a piece of another side, so neither point is a midpoint.

Nine squares are filled and sixteen are white. Seventeen squares are drawings and eight are sentences. In two filled drawings there are no tick marks, and a line of words says the dots are midpoints. On tests the midpoints are often not marked, so students should read the words and mark the figure themselves. Guessing does not work. Every simple guessing rule, such as filling every square where the segment looks parallel to a side, gets at least three squares 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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Mystery Picture

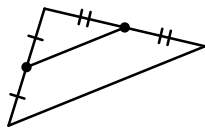
Is it a midsegment?

Name _____

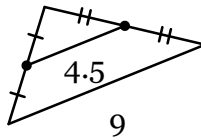
Period _____

Date _____

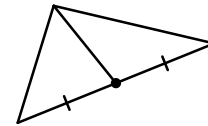
Each square shows a triangle with one segment inside it, or tells you about one. Is the segment a midsegment? If yes, fill the square with slanted lines. If no, leave it white. When you finish, look at the picture. If part of it is missing, or one square does not fit, check that square again.



A **midsegment** joins the midpoints of two sides.



It is parallel to the side it does not touch, and **half** as long.



Not a midsegment: one end is a corner.

Check both ends of the segment. Each end must be the midpoint of a side. A point is a midpoint when the two halves of its side have the same tick marks, or when the words say so. A dot with no ticks is not a midpoint unless the words say it is. A segment that is half as long as a side is not always a midsegment.

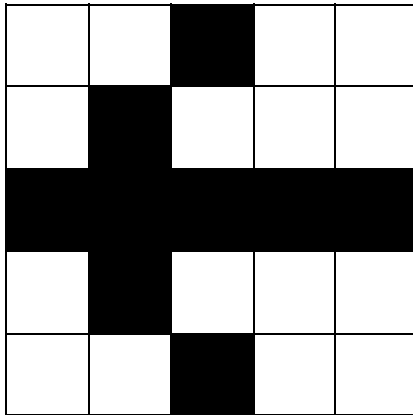
1 	2 In $\triangle ABC$, D is on AB and E is on AC. DE is half as long as BC. Is DE a midsegment?	3 	4 	5
6 	7 In $\triangle ABC$, D is the midpoint of AB and E is the midpoint of BC. Is DE a midsegment?	8 	9 In $\triangle STU$, M is the midpoint of TU. Is SM a midsegment?	10
11 	12 	13 In $\triangle PQR$, X is the midpoint of PR and Y is the midpoint of QR. Is XY a midsegment?	14 	15
16 	17 	18 	19 In $\triangle ABC$, D is the midpoint of AB and E is the midpoint of AC. Is DC a midsegment?	20
21 In $\triangle XYZ$, P is the midpoint of XY and Q is a point on YZ. Is PQ a midsegment?	22 	23 In $\triangle JKL$, M and N are the midpoints of JK and JL. Is MN a midsegment?	24 	25 In $\triangle DEF$, G is the midpoint of DE and H is the midpoint of EF. Is GF a midsegment?



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Mystery Picture — answers

For the teacher



The finished picture is a **left arrow**: a bar across the middle row, with the point at the left end.

A square is filled when both ends of the segment are midpoints of two sides of the triangle. It is white when one end is a corner, or when one end is not marked as a midpoint.

To check a square with a student, put a finger on each end of the segment and ask: “Is this point the midpoint of its side? What tells you so?”

1–5	1 · white One end is a corner of the triangle. This segment is a median, not a midsegment.	2 · white Nothing says D or E is a midpoint. Being half as long as BC does not make DE a midsegment.	3 · FILL Both ends have ticks on the two halves of their side. Both are midpoints.	4 · white The segment is parallel to a side, but no ticks mark its ends as midpoints. The lengths show it is a third of the side, not half.	5 · white The segment is half as long as a side, but no ticks mark its ends as midpoints.
6–10	6 · white One end is a ticked midpoint. The other end has no ticks, so it is not marked as a midpoint.	7 · FILL Both D and E are midpoints of sides of $\triangle ABC$, so DE joins two midpoints.	8 · white Two midpoints are marked, but the segment runs from one of them to a corner. It is a median.	9 · white S is a corner of $\triangle STU$. A midsegment has no end at a corner.	10 · white The segment looks parallel to a side, but nothing marks its ends as midpoints.
11–15	11 · FILL Both ends are ticked midpoints. The lengths also fit: the segment is half of the side it does not touch.	12 · FILL There are no ticks, but the words say both dots are midpoints.	13 · FILL Both X and Y are midpoints of sides of $\triangle PQR$, so XY joins two midpoints.	14 · FILL Both ends have ticks on the two halves of their side. Both are midpoints.	15 · FILL Both ends are ticked midpoints. The lengths also fit: the segment is half of the side it does not touch.
16–20	16 · white The ticks say a piece of one side equals a piece of another side. They do not split either side in half.	17 · FILL There are no ticks, but the words say both dots are midpoints.	18 · white The segment looks parallel to a side, but nothing marks its ends as midpoints.	19 · white C is a corner of $\triangle ABC$. A midsegment has no end at a corner.	20 · white Being half as long as a side does not make a midsegment. Nothing says the dots are midpoints.
21–25	21 · white Q is only a point on YZ. Nothing says it is the midpoint.	22 · white The ticks mark the midpoint of the third side, not the ends of the segment. Its ends are not marked as midpoints.	23 · FILL Both M and N are midpoints of sides of $\triangle JKL$, so MN joins two midpoints.	24 · white The dot is a midpoint, but the other end of the segment is a corner. It is a median.	25 · white F is a corner of $\triangle DEF$. A midsegment has no end at a corner.