

SCAVENGER HUNT



TRAPEZOIDS, ISOSCELES TRAPEZOIDS AND MIDSEGMENTS

Where Is Halfway Between the Bases?

One trapezoid on every card · find the midsegment or a base · the cards
check the answers

FREE

ANSWER

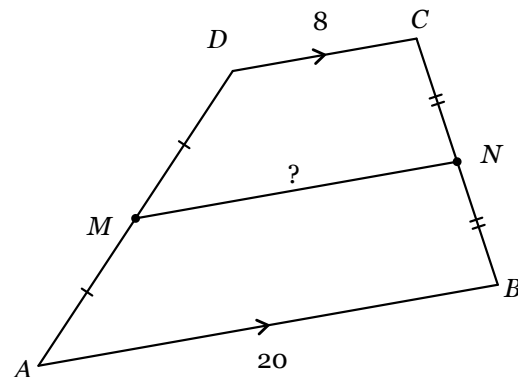
19

$AB \parallel DC$. M and N are the
midpoints of the legs.

$AB = 20$ and $DC = 8$

How long is MN?

*The midsegment is the average of the two bases.
Add them, then halve.*



A

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1. **Tape the 16 cards around the room**, in any order. Each card has a large letter in its bottom left corner. Start each group at a *different* one of these eight cards: *A D M F K E N L*.
2. **Say this once:** *“The midsegment is the average of the two bases. It sits halfway between them. Check every answer: the midsegment must be the same distance from each base. Eight right answers bring you back to your first card.”*
3. **Each group finds the length, then walks to the card with that number at the top.** Nothing else is needed.

16 cards	pages 3–10, one copy. There are two cards on each sheet. Cut the whole stack once.
Record sheet	page 11, one per student. It shows the bases, the legs and the midsegment as two small drawings.
Answers	pages 12–13, for you only. Do not put them up in the room.

Every card shows one trapezoid with its midsegment. The midsegment joins the midpoints of the two legs, and its length is the average of the two bases. On three ring cards both bases are given and the midsegment is asked. The most common mistake is to add the bases and forget to halve. On the other five, the midsegment and one base are given and the other base is asked. The most common mistake is to subtract one given length from the other. The right way is to double the midsegment and take away the known base.

Eight of the sixteen cards make the ring. A group reaches the other eight only by a wrong answer, but all the cards look the same. On every ring card, the common mistake gives the number at the top of one of the eight other cards. The group does that card, and its answer sends the group back to the card it got wrong. If the group makes the same mistake there, it goes one more card back and still does not reach the ring.

The check is the length of the group's list. A clean run is **eight lines**. Each wrong answer adds two. Every card has a line in small type under the question. It tells a group that arrived by a wrong answer what to check. A group that arrived by a right answer skips it. If a group keeps coming back to the same cards, do not give the answer. Ask: *“How far is the midsegment from each base? Are the two gaps the same?”*



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ANSWER

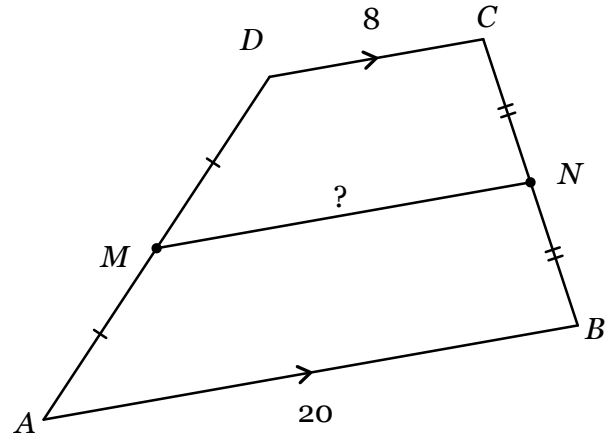
19

$AB \parallel DC$. M and N are the midpoints of the legs.

$AB = 20$ and $DC = 8$

How long is MN?

*The midsegment is the average of the two bases.
Add them, then halve.*



A

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ANSWER

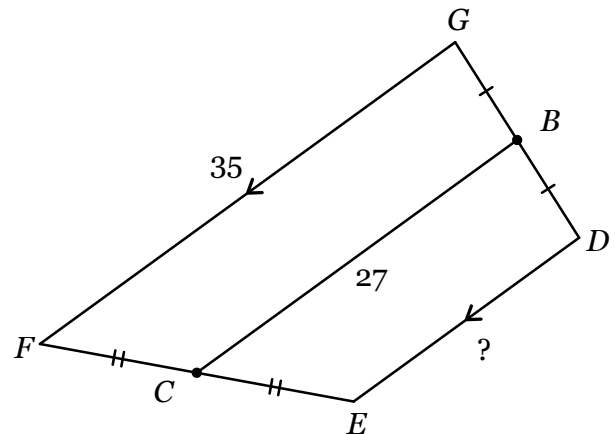
28

$DE \parallel GF$. B and C are the midpoints of the legs.

$GF = 35$ and $BC = 27$

How long is DE?

*A midsegment is never longer than both bases.
Check yours.*



B

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ANSWER

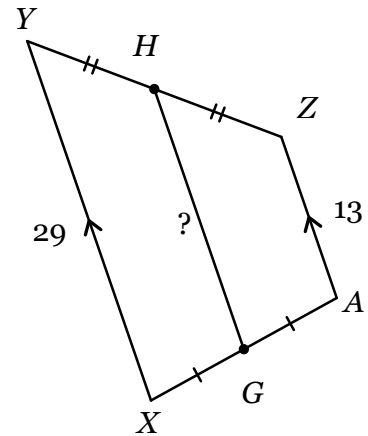
8

$XY \parallel AZ$. G and H are the midpoints of the legs.

$XY = 29$ and $AZ = 13$

How long is GH?

Each base sits the same distance from the midsegment. Test your answer.



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C

ANSWER

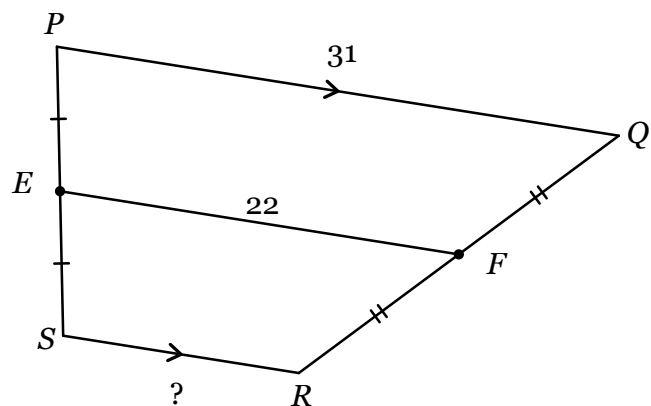
14

$PQ \parallel SR$. E and F are the midpoints of the legs.

$EF = 22$ and $PQ = 31$

How long is SR?

The midsegment sits halfway between the bases. Its length is not a difference.



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D

ANSWER

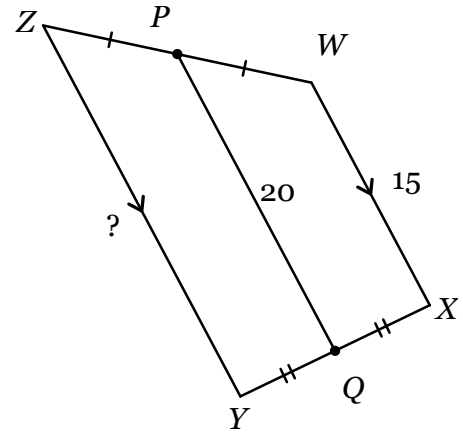
17

$WX \parallel ZY$. P and Q are the midpoints of the legs.

$PQ = 20$ and $WX = 15$

How long is ZY?

The gap from each base to the midsegment is the same.



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E

ANSWER

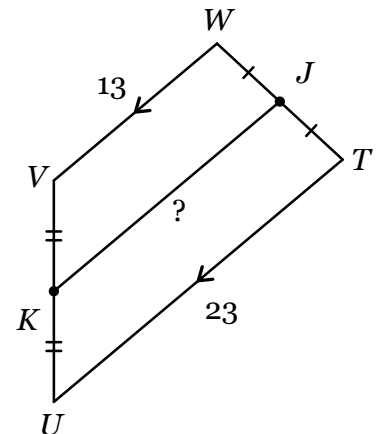
22

$TU \parallel WV$. J and K are the midpoints of the legs.

$TU = 23$ and $WV = 13$

How long is JK?

Your answer must lie between the two bases. Does it?



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F

ANSWER

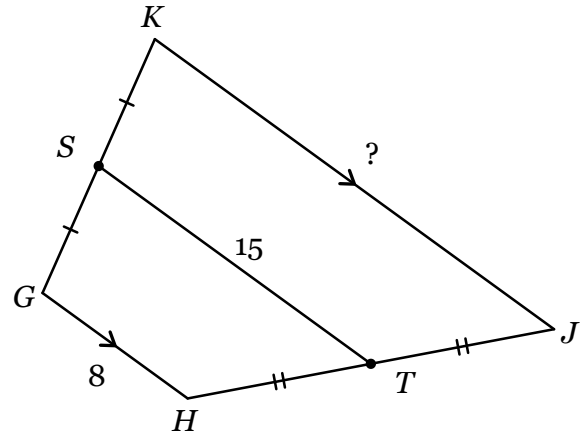
36

$GH \parallel KJ$. S and T are the midpoints of the legs.

$ST = 15$ and $GH = 8$

How long is KJ?

Add the two bases, then take half. Half is the step to watch.



G

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ANSWER

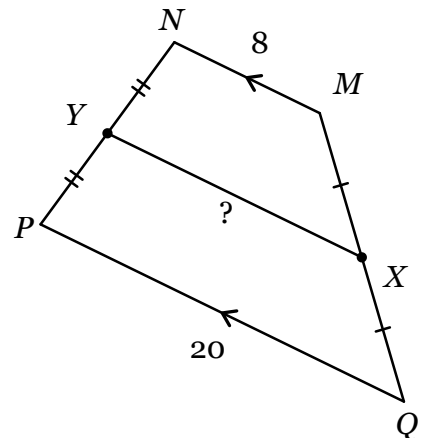
9

$MN \parallel QP$. X and Y are the midpoints of the legs.

$MN = 8$ and $QP = 20$

How long is XY?

The midsegment is the average of the bases, not their difference.



H

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ANSWER

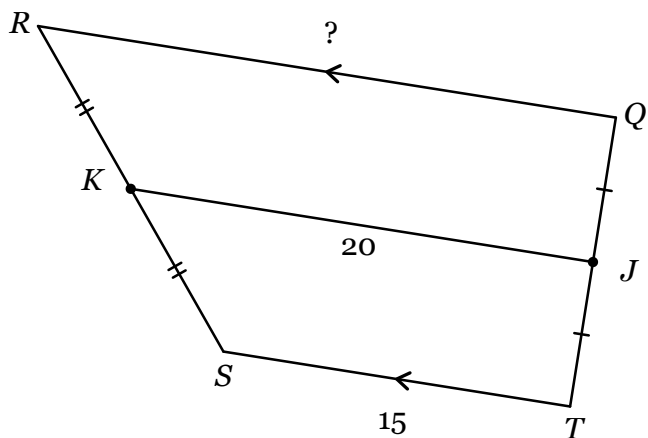
42

$QR \parallel TS$. J and K are the midpoints of the legs.

$JK = 20$ and $TS = 15$

How long is QR?

The sum of the bases is too long. The midsegment is half of it.



J

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ANSWER

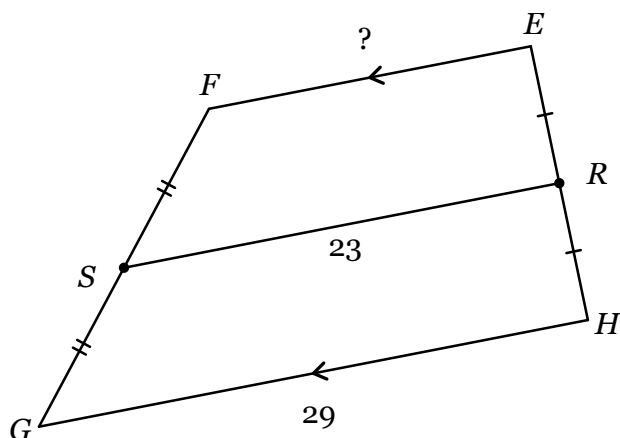
18

$EF \parallel HG$. R and S are the midpoints of the legs.

$HG = 29$ and $RS = 23$

How long is EF?

Is the midsegment halfway between the two bases now? It has to be.



K

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ANSWER

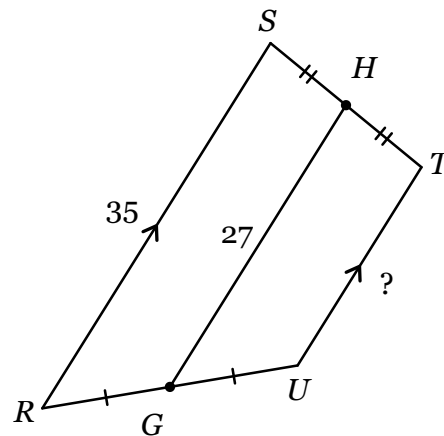
21

$RS \parallel UT$. G and H are the midpoints of the legs.

$RS = 35$ and $GH = 27$

How long is UT?

One base is short and one is long. The midsegment is in the middle.



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L

ANSWER

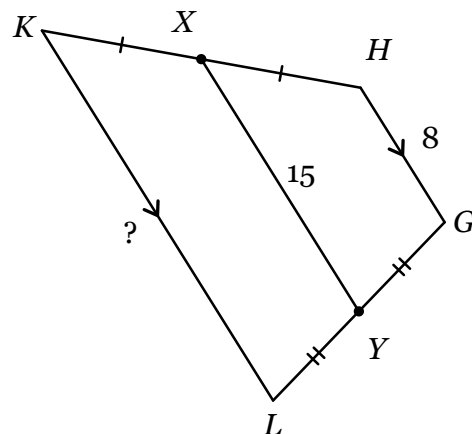
13

$KL \parallel HG$. X and Y are the midpoints of the legs.

$HG = 8$ and $XY = 15$

How long is KL?

Double the midsegment, then take away the base you know.



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M

ANSWER

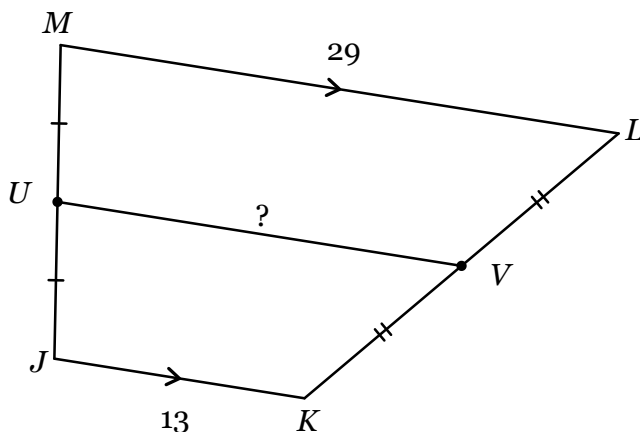
25

$JK \parallel ML$. U and V are the midpoints of the legs.

$JK = 13$ and $ML = 29$

How long is UV ?

Halfway between two lengths is their sum, cut in half.



N

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ANSWER

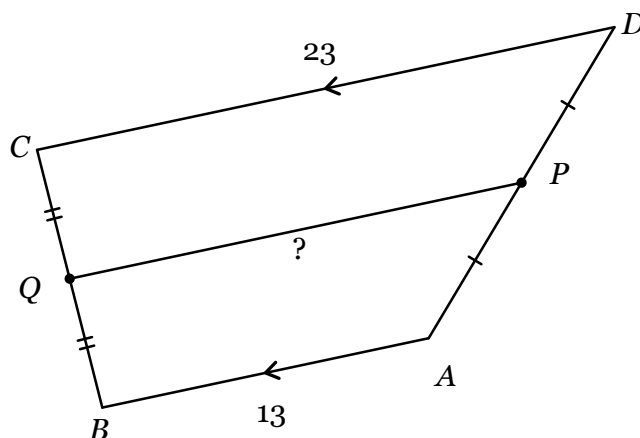
6

$AB \parallel DC$. P and Q are the midpoints of the legs.

$AB = 13$ and $DC = 23$

How long is PQ ?

Put your answer with the known base. Is their average the midsegment?



P

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ANSWER

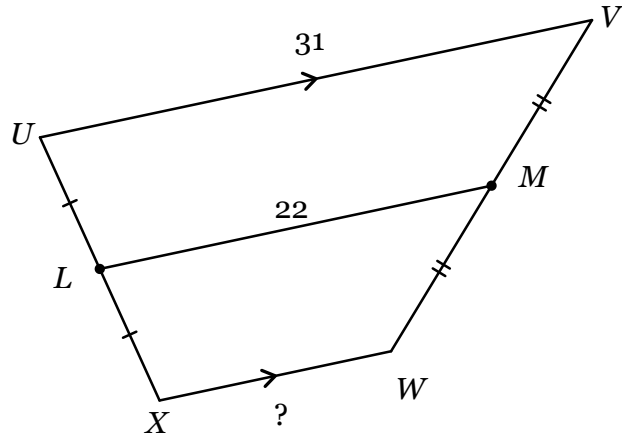
7

$UV \parallel XW$. L and M are the midpoints of the legs.

$LM = 22$ and $UV = 31$

How long is XW ?

Is the midsegment halfway between your two bases? Check the two gaps.



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Q

ANSWER

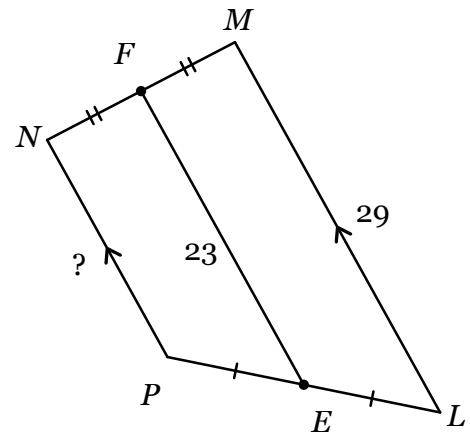
5

$LM \parallel PN$. E and F are the midpoints of the legs.

$LM = 29$ and $EF = 23$

How long is PN ?

Take the midsegment from the base? That gives a gap, not a base.



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R

Scavenger Hunt — where I went

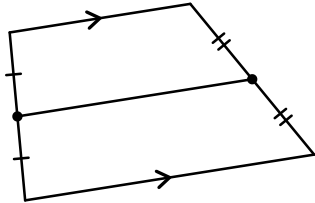
The midsegment of a trapezoid

Name _____

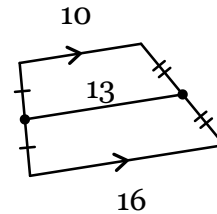
Period _____

Date _____

Do the card you are at. Fill in one line. Then find the card with your answer at the top. **Check each answer: find how far the midsegment is from each base. The two gaps must be equal.** A clean run is eight lines. Each card has a line in small type under the question. **If you are on a card because you went wrong, its line says what to check. If you were right, skip it.**



The **bases** are the parallel sides. The **midsegment** joins the midpoints of the two **legs**.



The midsegment is the **average** of the two bases: $(16 + 10) \div 2 = 13$.

Card letter	My answer	The two gaps (they must be equal)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Why does the midsegment stand exactly halfway between the two bases?

Every number stands for a letter. Write the letter for each of your answers in the box above that number. Leave the other boxes empty. Then read the boxes you filled, left to right. **If they do not spell a word, one answer is wrong.**

5 = R	6 = I	7 = A	8 = F	9 = E	13 = T	14 = O	17 = B	18 = E	19 = F	21 = A	22 = I	25 = R	28 = B	36 = O	42 = T
5	6	7	8	9	13	14	17	18	19	21	22	25	28	36	42



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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.

A → D → M → F → K → E → N → L → A

Why does the midsegment stand exactly halfway between the two bases? The answer is *TO BE FAIR*. The ring's answers, in the order of the boxes on the record sheet (smallest number first), with their letters: **13 T • 14 O • 17 B • 18 E • 19 F • 21 A • 22 I • 25 R**.

	Card	Given and asked	Answer, and why	Wrong answer from the common mistake	Joke letter for the number at its top
1	A	AB = 20, DC = 8, find MN	14. The midsegment is the average of the bases: $(20 + 8) \div 2 = 14$.	28, from adding the bases and not halving	F
2	D	EF = 22, PQ = 31, find SR	13. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 22 - 31 = 13$. Check: 22 is 9 from each base.	9, from subtracting: $31 - 22$	O
3	M	XY = 15, HG = 8, find KL	22. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 15 - 8 = 22$. Check: 15 is 7 from each base.	7, from subtracting: $15 - 8$	T
4	F	TU = 23, WV = 13, find JK	18. The midsegment is the average of the bases: $(23 + 13) \div 2 = 18$.	36, from adding the bases and not halving	I
5	K	RS = 23, HG = 29, find EF	17. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 23 - 29 = 17$. Check: 23 is 6 from each base.	6, from subtracting: $29 - 23$	E
6	E	PQ = 20, WX = 15, find ZY	25. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 20 - 15 = 25$. Check: 20 is 5 from each base.	5, from subtracting: $20 - 15$	B
7	N	JK = 13, ML = 29, find UV	21. The midsegment is the average of the bases: $(13 + 29) \div 2 = 21$.	42, from adding the bases and not halving	R
8	L	GH = 27, RS = 35, find UT	19. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 27 - 35 = 19$. Check: 27 is 8 from each base.	8, from subtracting: $35 - 27$	A

Each wrong answer in the table is the number at the top of a card off the ring. Those cards are on the next page.

Scavenger Hunt — the cards off the ring

For the teacher

A group reaches these eight cards only by a wrong answer. The number at the top of each one is the wrong answer from one ring card. Its right answer is the number at the top of that ring card, so the group goes back to the card it got wrong. If the group makes the same mistake again, it goes to another card off the ring. So a second wrong answer never moves a group forward.

Card	Given and asked	Answer, and why	Wrong answer from the common mistake	Joke letter for the number at its top
B	BC = 27, GF = 35, find DE	19. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 27 - 35 = 19$. Check: 27 is 8 from each base.	8, from subtracting: $35 - 27$	B
H	MN = 8, QP = 20, find XY	14. The midsegment is the average of the bases: $(8 + 20) \div 2 = 14$.	28, from adding the bases and not halving	E
Q	LM = 22, UV = 31, find XW	13. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 22 - 31 = 13$. Check: 22 is 9 from each base.	9, from subtracting: $31 - 22$	A
G	ST = 15, GH = 8, find KJ	22. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 15 - 8 = 22$. Check: 15 is 7 from each base.	7, from subtracting: $15 - 8$	O
P	AB = 13, DC = 23, find PQ	18. The midsegment is the average of the bases: $(13 + 23) \div 2 = 18$.	36, from adding the bases and not halving	I
R	EF = 23, LM = 29, find PN	17. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 23 - 29 = 17$. Check: 23 is 6 from each base.	6, from subtracting: $29 - 23$	R
J	JK = 20, TS = 15, find QR	25. The midsegment is halfway between the bases, so double it and take away the known base: $2 \times 20 - 15 = 25$. Check: 20 is 5 from each base.	5, from subtracting: $20 - 15$	T
C	XY = 29, AZ = 13, find GH	21. The midsegment is the average of the bases: $(29 + 13) \div 2 = 21$.	42, from adding the bases and not halving	F

Other mistakes lead to no card at all. A group might halve only one base, as for a triangle's midsegment, or double the midsegment, or average the two given numbers when a base is asked. Its answer is then not the number at the top of any card, and the group knows to check its work.

Guessing does not work. Every simple rule that uses only the printed numbers, such as always averaging the two numbers, answers at most six of the sixteen cards correctly.