

SCAVENGER HUNT



CONGRUENT SEGMENTS AND SEGMENT BISECTORS

Congruent Segments & Midpoints

Read the ticks · the half or the whole · x is not the answer · the cards
check the answers

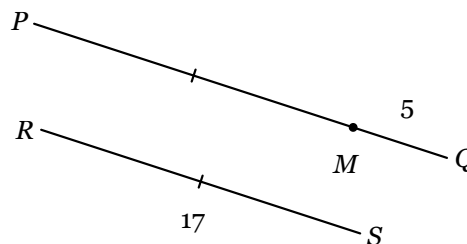
FREE

ANSWER

14

Find PQ .

Ticks that join two different segments
do not make a point a midpoint.



A

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Scavenger Hunt — how to run it

a full class period

1. **Tape the 16 cards round the room**, in any order. Send each group to a *different* card. Each card has a large letter in its bottom left corner. Start each group on **one of these eight**: *N Q D M R C H F*.
2. **Say this once**: “Write what the marks say in letters first, like $AM = MB$. Then circle what the question asks for: x , a half, or the whole. Eight lines and you are back where you started.”
3. **Find the number. Then find the card with your answer at the top.**

16 cards	pages 3–10, one copy. There are two cards to a sheet, so cut the stack once.
Record sheet	page 11, one per student. It carries same ticks, different ticks and no marks as pictures.
Answers	pages 12–13. These are for you. They do not go in the room.

The cards come in five kinds. Five cards: one half is ticked to match a separate segment. Two cards: a half is given, and the whole is asked for. Six cards: each half is an expression, and a half is asked for. Two cards: two segments bisect each other. One card: each half is an expression, and the whole is asked for. The expression cards never ask for x . They ask for a half or the whole, because students often stop at x .

Eight of the 16 cards make the ring. The other eight are where a wrong answer goes. They look the same as the ring cards. A group may halve when it should double, or stop at x or at the half. It may read ticks on two different segments as making a midpoint, or pair the wrong halves of two crossing segments. Then its number is at the top of one of those cards. The group does that card, and its answer sends the group back to the card it got wrong. If the group goes wrong there too, it goes one more card back, never forward.

The check is the length of their row. A clean run is **eight lines**. Every wrong answer adds two more. The line at the foot of each card is a tip about the card a group has just come from. If a group goes round in circles, do not give the answer. Ask: “What did the marks say, in letters?”



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.

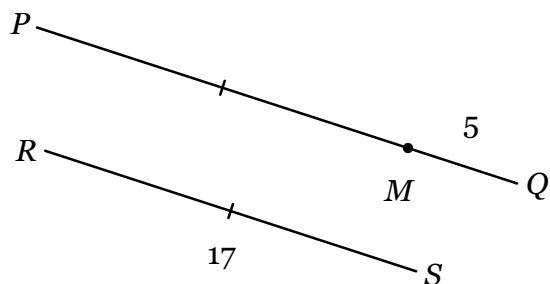
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ANSWER

14

Find PQ .

Ticks that join two different segments do not make a point a midpoint.



A

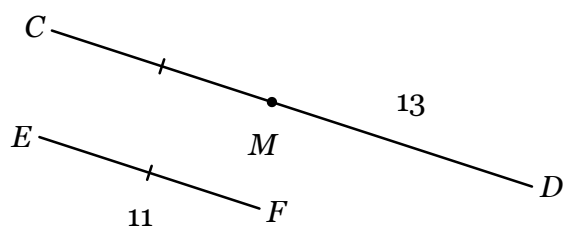
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ANSWER

15

Find CD .

A half is not the whole: check which one the question asks for.



B

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ANSWER

30

K is the midpoint of JL and $JK = 14$. **Find JL .**

Check that the whole is exactly twice either half.

C

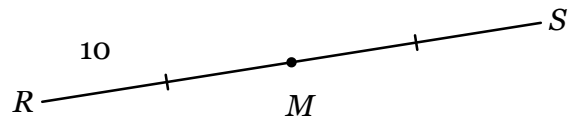
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ANSWER

17

Find RS .

Same number of ticks means the same length, whichever segments they are on.



D

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ANSWER

7

W is the midpoint of UV , $UW = 2x$ and $WV = 4x - 30$. **Find UW .**

A midpoint cuts the whole into two halves, so the whole is a half doubled.

E

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ANSWER

13

T is the midpoint of GH , $GT = 2x + 2$ and $TH = 3x - 8$. **Find GT .**

A tick pairs a segment with every segment carrying that many ticks.

F

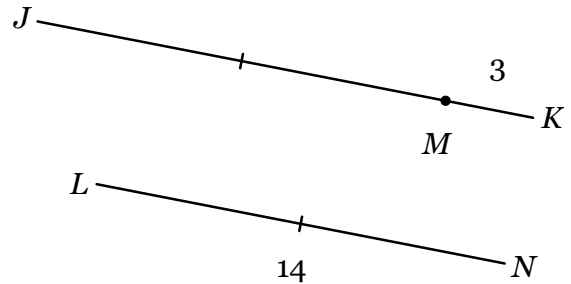
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ANSWER

5

Find JK .

When the half is given and the whole is asked for, double it. Do not halve it.



G

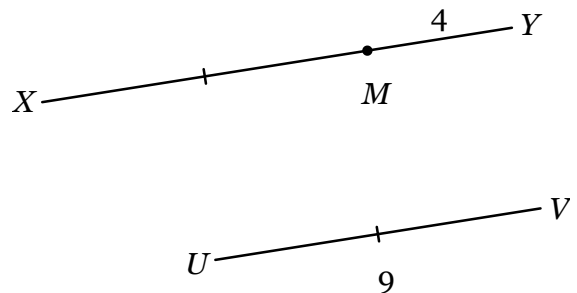
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ANSWER

28

Find XY .

Read the ticks, not the picture. A point can look central without being the midpoint.



H

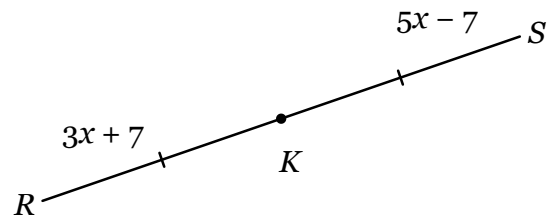
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ANSWER

8

Find RK .

Same ticks always mean the same length, even on a segment that is not the one asked about.



J

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ANSWER

10

N is the midpoint of XY , $XN = x + 5$ and $NY = 2x - 3$. **Find XN .**

The letter x is a step on the way. What is asked for is a length.

K

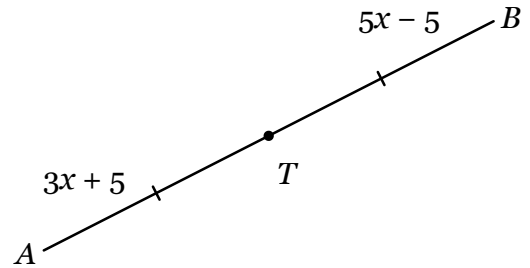
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ANSWER

26

Find AT .

One tick pairs with one tick, and two ticks pair with two. This is true even between a segment and its own halves.



L

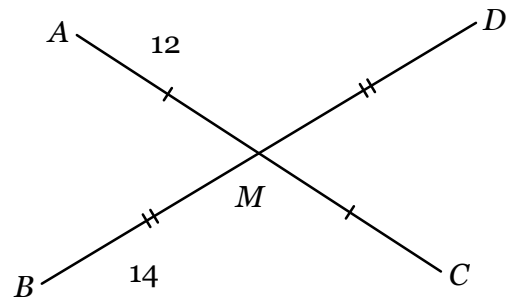
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ANSWER

20

Find AC .

A half is never longer than the whole it is half of.



M

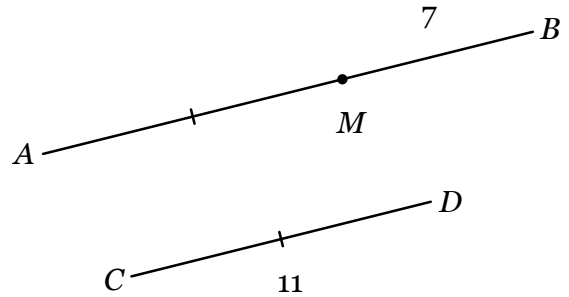
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ANSWER

22

Find AB .

Write what the marks say in letters before you put a number in.



N

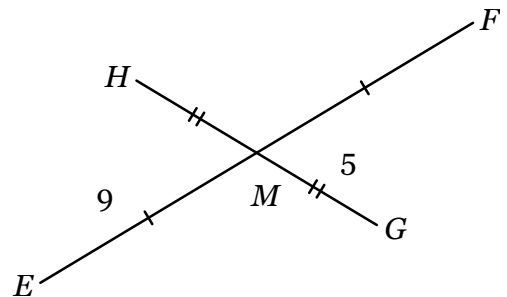
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ANSWER

6

Find EF .

Is x the answer, or a step toward the length the question asks for?



P

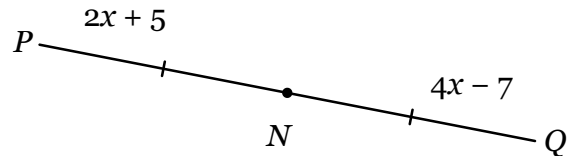
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ANSWER

18

Find PN .

Circle what the question asks for: x , a half, or the whole.



Q

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ANSWER

24

M is the midpoint of EF , $EM = 2x + 3$ and $MF = 4x - 9$. **Find EF .**

Put x back into both halves: do they come out the same?

R

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Scavenger Hunt — where I went

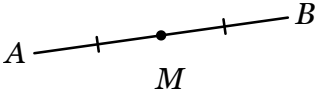
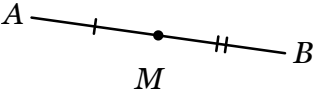
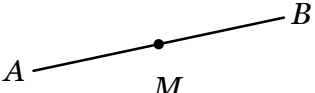
Congruent segments & midpoints

Name _____

Period _____

Date _____

Work out the card you are at, fill in one line, then find the card with your answer at the top. **Write what the marks say in letters first**, like $AM = MB$ or $AB = 2 \cdot AM$, then put the numbers in. A clean run is eight lines. A longer row means one answer was wrong. **If you are on a card because you went wrong, its foot line says what to check on the card you came from.** If you were right, skip it.

 Same ticks $AM \cong MB$, so $AM = MB$: M is the midpoint	 Different ticks nothing is said about AM and MB	 No marks no way to tell, no matter how centered it looks
--	---	--

Card letter	What the marks say, in letters first	My answer
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

M stands exactly halfway along AB, with matching ticks on both halves. How is AB split?

Every number stands for a letter. Write the letter for each answer in the box under that number. Leave the other boxes empty. Then read the boxes you filled across. **If it does not spell two words, one answer was wrong.**

5 = N 6 = E 7 = V 8 = A 10 = D 13 = D 14 = E 15 = E 17 = E 18 = A 20 = D 22 = E 24 = V 26 = D 28 = E
30 = N

5	6	7	8	10	13	14	15	17	18	20	22	24	26	28	30



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Scavenger Hunt — answers

For the teacher

The ring, in order, is below. A group may start at any card on it. Eight right answers bring the group back to that card.

N → Q → D → M → R → C → H → F → N

M stands exactly halfway along AB, with matching ticks on both halves. How is AB split?

DEAD EVEN. The letters are read from the smallest answer to the largest. That is the order of the boxes on the record sheet.

The answers on the ring, smallest first: 13 = D, 17 = E, 18 = A, 20 = D, 22 = E, 24 = V, 28 = E, 30 = N. That spells DEAD EVEN.

	Card	Kind of card	Working	Answer	Wrong answer	Letter for its top number
1	N	one half is ticked to match a separate segment	$CD = AM = 11; 11 + 7$	18	14. This is twice MB. The student read the ticks as making M the midpoint.	E
2	Q	each half is an expression, and a half is asked for	$x = 6$, then the half	17	6. This is x , but a length was asked for.	A
3	D	a half is given, and the whole is asked for	2×10	20	5. The student halved instead of doubling.	E
4	M	two segments bisect each other	$MC = MA = 12; 2 \times 12$	24	26. The student added a half of each crossing segment, instead of the two halves of one segment.	D
5	R	each half is an expression, and the whole is asked for	$x = 6$, half 15, doubled	30	15. This is EM, but the whole was asked for.	V
6	C	a half is given, and the whole is asked for	2×14	28	7. The student halved instead of doubling.	N
7	H	one half is ticked to match a separate segment	$UV = XM = 9; 9 + 4$	13	8. This is twice MY. The student read the ticks as making M the midpoint.	E
8	F	each half is an expression, and a half is asked for	$x = 10$, then the half	22	10. This is x , but a length was asked for.	D

Each wrong answer is the top number of a card on the next page. None of them is an arithmetic slip. Each comes from a common mistake: halving when the whole was asked for, stopping at x or at the half, reading ticks on two different segments as a midpoint, or pairing a half of one segment with a half of the other.

Scavenger Hunt — the cards off the ring

For the teacher

These eight cards are where a wrong answer goes. The top of each is the number a group gets by making a mistake at one ring card. Its own answer is the top of that ring card. So a group that lands here goes back to the card it got wrong, and its row is two lines longer. **A group cannot reach one of these cards by being right.** A mistake on one of these cards gives the top of the card before it in this list. So going wrong twice sends a group one more card back. It never sends the group forward, and it never gives a number that is on no card.

Card	Kind of card	Working	Answer	Wrong answer	Letter for its top number
A	one half is ticked to match a separate segment	$RS = PM = 17; 17 + 5$	22	10. This is twice MQ. The student read the ticks as making M the midpoint.	E
P	two segments bisect each other	$MF = ME = 9; 2 \times 9$	18	14. The student added a half of each crossing segment, instead of the two halves of one segment.	E
G	one half is ticked to match a separate segment	$LN = JM = 14; 14 + 3$	17	6. This is twice MK. The student read the ticks as making M the midpoint.	N
L	each half is an expression, and a half is asked for	$x = 5$, then the half	20	5. This is x , but a length was asked for.	D
B	one half is ticked to match a separate segment	$EF = CM = 11; 11 + 13$	24	26. This is twice MD. The student read the ticks as making M the midpoint.	E
E	each half is an expression, and a half is asked for	$x = 15$, then the half	30	15. This is x , but a length was asked for.	V
J	each half is an expression, and a half is asked for	$x = 7$, then the half	28	7. This is x , but a length was asked for.	A
K	each half is an expression, and a half is asked for	$x = 8$, then the half	13	8. This is x , but a length was asked for.	D

The line at the foot of every card is a tip, not an answer. Every card has one in the same place. On a card off the ring, it names the mistake that sent the group there. Cards with a drawing and cards without are on the ring and off it. Every kind of card off the ring is also on the ring.

Guessing does not work. No simple rule that uses only the printed numbers, such as adding them, gets more than five of the 16 cards right.