

CUT & GLUE SORT



MEASURING SEGMENTS AND SEGMENT ADDITION

Segment Addition: Add, Take Away, or Cannot Be Found?

Add the pieces · take one from the whole · cannot be found

FREE

A

Find AC.

B

Find AC.

C

D, E and F are on one line, in that order. $DF = 40$ and $DE = 14$.

Find EF .

D

Find QS.

Cut & Glue Sort — how to run it

25 minutes, including the cutting

1. **Hand out pages 3 and 4**, one of each per student, and scissors and glue.
2. **Say this once:** *“Don't work anything out. Ask yourself three questions. Is the length made of pieces you know? Is it the whole with one piece taken away? Or can it not be found at all?”*
3. **Every row gets 4 pieces.** A row with more or fewer has a piece in the wrong place. This lets you mark a sheet in ten seconds.

Student sheets	pages 3 and 4, one of each per student. The first has three small pictures: points in the order A, B, C, points in the order A, C, B, and a bend.
Answers	page 5.

Why sort before computing. Finding the whole from two pieces and finding a piece from the whole look the same on the page. The second is much harder for students. A student who glues these twelve pieces chooses the operation twelve times without doing any arithmetic.

The third row is the hard one. You can add two pieces only when all the points are on one line and the middle point is between the other two. On each of the four pieces in that row, something is missing. The points are not on one line, or nothing says which point is between, or no length you know reaches the point asked for. The answer key gives the reason for each piece.

Every kind of piece is in all three rows. Pieces in words, pieces with three points drawn, and pieces with four points drawn each appear in every row. So a student cannot sort a piece by how it looks or how it is worded.



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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Add, take away, or cannot be found?

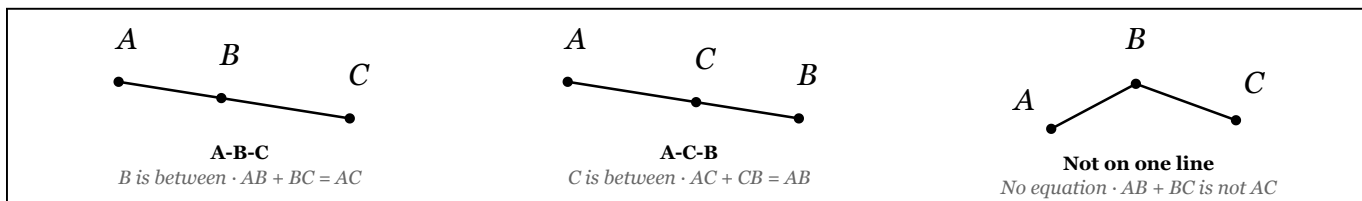
Measuring segments

Name _____

Period _____

Date _____

Cut out the twelve pieces on the next page. **Do not work anything out.** For each piece, decide how you would find the length. Then glue it into the row that fits. **The pieces make the whole only when the points are on one line. You must also know which point is between the others.**



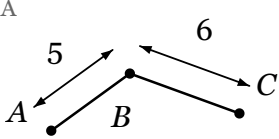
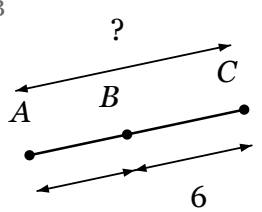
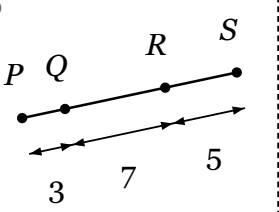
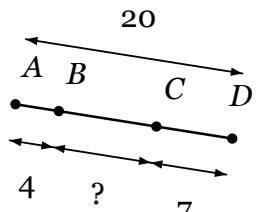
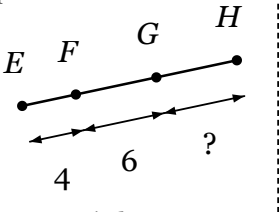
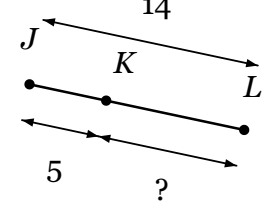
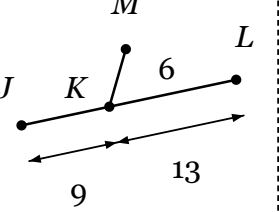
ADD: PIECES MAKE IT. *The length is made of pieces you know.*

SUBTRACT: WHOLE MINUS A PIECE. *You know the whole and the other pieces.*

CANNOT TELL. *The pieces do not make it, or nothing says which point is between the others.*

The twelve pieces

Cut along the dotted lines

A  Find AC.	B  Find AC.	C D, E and F are on one line, in that order. $DF = 40$ and $DE = 14$. Find EF.	D  Find QS.
E A, B and C are on one line. $AB = 12$, $BC = 5$. Find AC.	F  Find BC.	G A, C and B are on one line, in that order. $AC = 9$ and $CB = 4$. Find AB.	H  Find GH.
J  Find KL.	K P, Q, R and S are on one line, in that order. $PS = 18$ and $QS = 11$. Find PQ.	L E, F, G and H are on one line, in that order. $EF = 4$, $FG = 6$ and $GH = 3$. Find FH.	M  Find ML.



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Cut & Glue Sort — answers

For the teacher

ADD: PIECES MAKE IT	B — $AC = 11$: Add the pieces.	D — $QS = 12$: Add the pieces.	G — $AB = 13$: Add the pieces.	L — $FH = 9$: Add the pieces.
SUBTRACT: WHOLE MINUS A PIECE	C — $EF = 26$: Take the other pieces from the whole.	F — $BC = 9$: Take the other pieces from the whole.	J — $KL = 9$: Take the other pieces from the whole.	K — $PQ = 7$: Take the other pieces from the whole.
CANNOT TELL	A — AC : A, B and C are not on one line. The path bends.	E — AC : Nothing says which point is between. AC could be 17 or 7.	H — GH : No length you know reaches H.	M — ML : M is not on the line through J, K and L.

The lengths are for you, not for the students. The students were told not to work them out. If a class finishes early, working them out is a good next step. In the last row, a student who adds anyway gets a number that cannot be trusted.

Guessing does not work. Every simple guessing rule, such as sorting by where the question mark is, gets at most eight of the twelve pieces right.