

SCAVENGER HUNT



SSS AND SAS SIMILARITY

Which Side Goes With Which?

Two triangles and an equal angle on every card · find the missing side · the cards check the answers

FREE

ANSWER

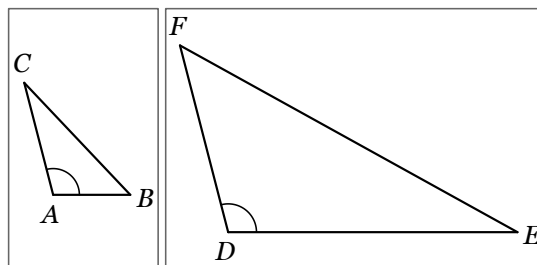
16.5

$\angle A = \angle D$. $AB = 4$, $BC = 8$, $CA = 6$.

$DE = 15$, $FD = 10$.

How long is EF?

Sort the two sides at the equal angle by size. Short goes with short.



C

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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: *C J N K B Q G L*.
2. **Say this once:** *“The two triangles are similar by SAS Similarity. Match the two sides at the equal angle by size: short with short, long with long. Do not match them by the letters. Write the factor, then find the side. Eight right answers bring you back to your first card.”*
3. **Each group finds the number, then walks to the card with that number at the top.** Calculators are fine.

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.
Answers	pages 12–13, for you only. Do not put them up in the room.

Every card shows two triangles with one pair of equal angles, marked with an arc. The card gives the two sides at the equal angle in each triangle, and the third side of the first triangle. The group finds the third side of the second triangle. The sides at the equal angles pair by size, and their quotient is the scale factor. On every card the letters are set so that pairing first letter with first letter pairs the wrong sides. This is the most common mistake in this lesson, and it gives a wrong factor and a wrong length.

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: *“Which side is the shorter one at the equal angle in each triangle? Divide those two.”*



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ANSWER

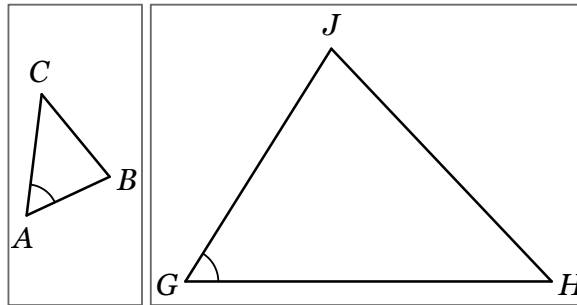
15

$\angle A = \angle G$. $CA = 8$, $AB = 6$, $BC = 7$.

$JG = 18$, $GH = 24$.

How long is HJ?

Write each triangle's two sides from longest to shortest first.



A

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ANSWER

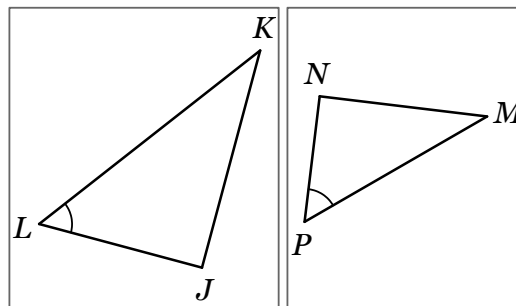
18

$\angle L = \angle P$. $KL = 10$, $LJ = 6$, $JK = 8$.

$NP = 4.5$, $PM = 7.5$.

How long is MN?

Divide a long side by a long side. Is the factor more or less than 1?



B

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ANSWER

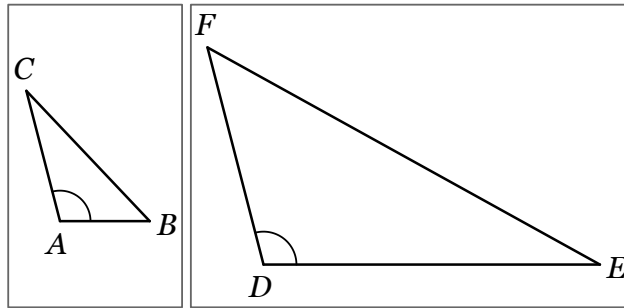
16.5

$\angle A = \angle D$. $AB = 4$, $BC = 8$, $CA = 6$.

$DE = 15$, $FD = 10$.

How long is EF?

Sort the two sides at the equal angle by size. Short goes with short.



C

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ANSWER

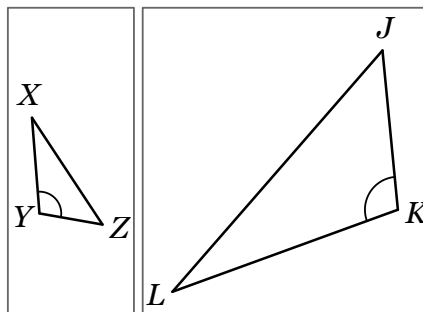
28

$\angle Y = \angle K$. $YZ = 4$, $ZX = 8$, $XY = 6$.

$JK = 10$, $KL = 15$.

How long is LJ?

Two divisions give the same factor. Do yours?



D

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ANSWER

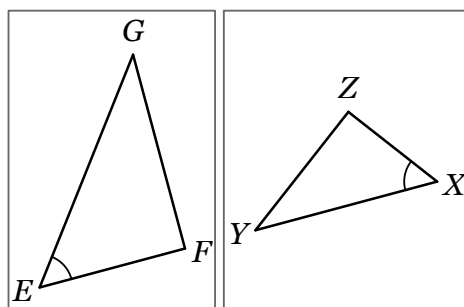
35

$\angle E = \angle X$. $GE = 10$, $EF = 6$, $FG = 8$.

$XY = 7.5$, $ZX = 4.5$.

How long is YZ?

Does the factor work for the short sides and for the long sides?



E

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ANSWER

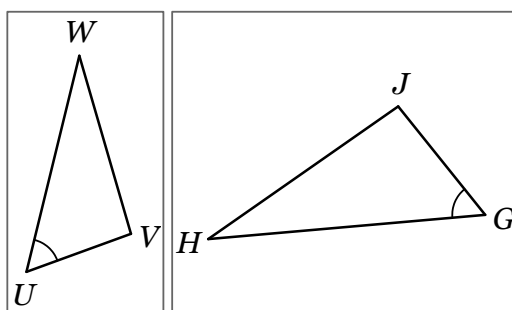
33

$\angle U = \angle G$. $WU = 12$, $UV = 6$, $VW = 10$.

$JG = 7.5$, $GH = 15$.

How long is HJ?

A factor works for every pair of sides. Test both pairs.



F

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ANSWER

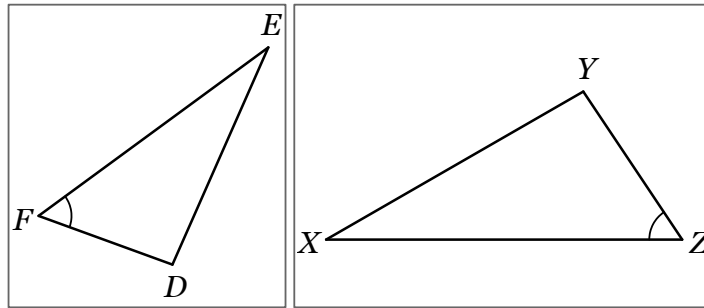
17.5

$\angle F = \angle Z$. $EF = 12$, $FD = 6$, $DE = 10$.

$ZX = 15$, $YZ = 7.5$.

How long is XY?

Multiply the third side by the factor, not by a guess.



G

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ANSWER

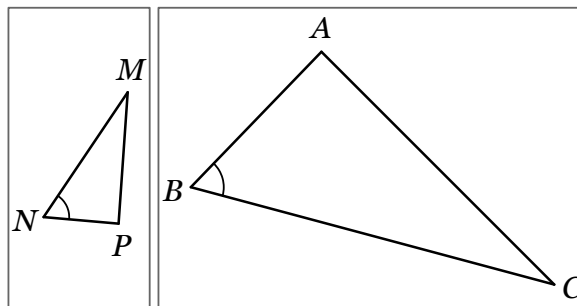
25

$\angle N = \angle B$. $MN = 8$, $NP = 4$, $PM = 7$.

$AB = 10$, $BC = 20$.

How long is CA?

Which two sides meet at the equal angle? Pair them by size.



H

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ANSWER

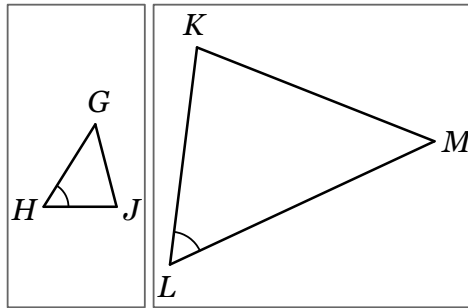
20

$\angle H = \angle L$. $HJ = 6$, $JG = 7$, $GH = 8$.

$LM = 24$, $KL = 18$.

How long is MK?

Check the factor with the second pair of sides too.



J

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ANSWER

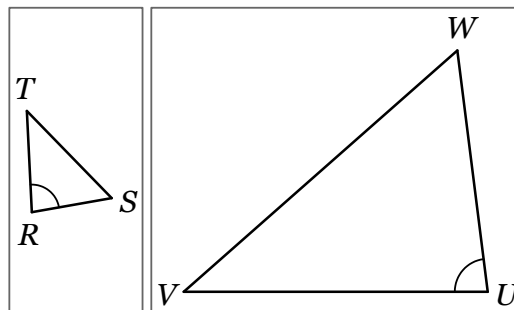
7.5

$\angle R = \angle U$. $RS = 4$, $ST = 6$, $TR = 5$.

$WU = 12$, $UV = 15$.

How long is VW?

Which side is across from the equal angle? Its partner is across from the other one.



K

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ANSWER

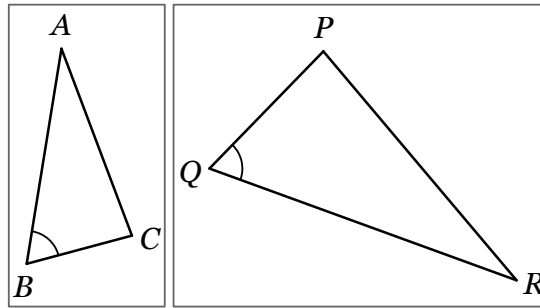
12.5

$\angle B = \angle Q$. $AB = 12$, $BC = 6$, $CA = 11$.

$PQ = 9$, $QR = 18$.

How long is RP?

Is the second triangle bigger or smaller? The answer has to agree.



L

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ANSWER

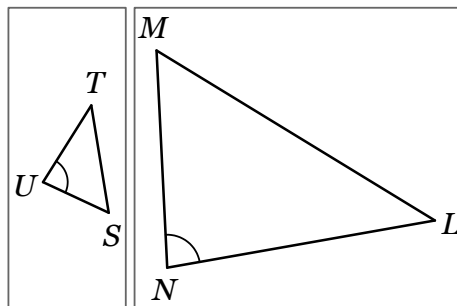
10

$\angle U = \angle N$. $TU = 5$, $US = 4$, $ST = 6$.

$NL = 15$, $MN = 12$.

How long is LM?

First letter with first letter is not a rule. Compare the lengths.



M

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ANSWER

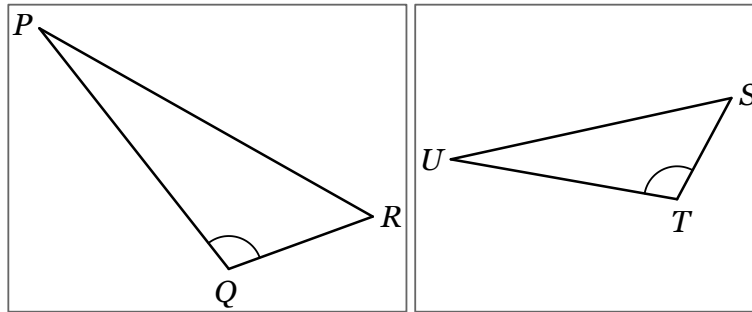
21

$\angle Q = \angle T$. $RP = 10$, $PQ = 8$, $QR = 4$.

$ST = 3$, $TU = 6$.

How long is US?

The letters do not show which sides match. The lengths do.



N

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ANSWER

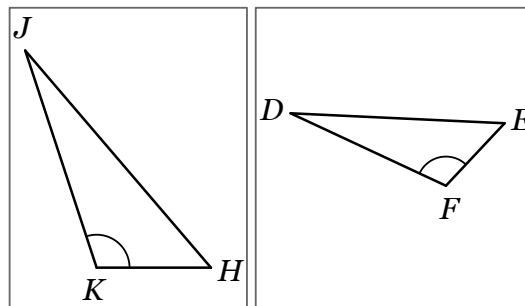
22.5

$\angle K = \angle F$. $HJ = 10$, $JK = 8$, $KH = 4$.

$EF = 3$, $FD = 6$.

How long is DE?

The side across from the equal angle matches the side across from its partner.



P

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ANSWER

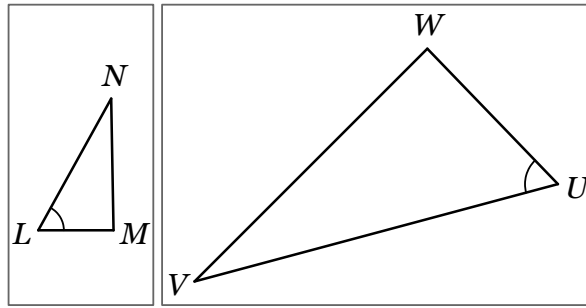
6

$\angle L = \angle U$. $NL = 8$, $LM = 4$, $MN = 7$.

$WU = 10$, $UV = 20$.

How long is VW?

Write the factor down before you find the side.



Q

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ANSWER

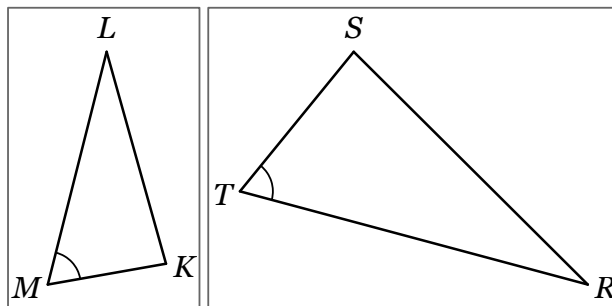
30

$\angle M = \angle T$. $KL = 11$, $LM = 12$, $MK = 6$.

$TR = 18$, $ST = 9$.

How long is RS?

Pair the shorter side with the shorter side, whatever the letters say.



R

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Scavenger Hunt — where I went

SSS and SAS similarity

Name _____

Period _____

Date _____

Do the card you are at. Fill in one line. Then find the card with your answer at the top. The drawings are not full size, so use the numbers written on the card. **Write your factor before you write your answer.** 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.**

SAS Similarity. Two pairs of sides are in the same ratio, and the angles between them are equal. The angle **between** two sides is at the corner where they meet. **Match the two sides at the equal angle by size: short with short, long with long.** The letters do not tell you which sides match.

Card letter	My factor	My answer
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

What does a pair of similar triangles come in?

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.**

6 = T 7.5 = W 10 = Z 12.5 = O 15 = E 16.5 = S 17.5 = I 18 = Z 20 = E 21 = S 22.5 = S 25 = T 28 = W 30 = I
33 = S 35 = O

6	7.5	10	12.5	15	16.5	17.5	18	20	21	22.5	25	28	30	33	35



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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.

C → J → N → K → B → Q → G → L → C

What does a pair of similar triangles come in? The answer is *TWO SIZES*. The ring's answers, in the order of the boxes on the record sheet (smallest number first), with their letters: **6 T • 7.5 W • 12.5 O • 16.5 S • 17.5 I • 18 Z • 20 E • 21 S**.

	Card	Given and asked	Answer, and why	Wrong answer from the common mistake	Joke letter for the number at its top
1	C	$\angle A = \angle D$. $AB = 4$, $BC = 8$, $CA = 6$. $DE = 15$, $FD = 10$. How long is EF ?	20 . Short with short: AB with FD . Long with long: CA with DE . The factor is $10 \div 4 = 2.5$, so $EF = 8 \times 2.5 = 20$.	30: $DE \div AB$ in letter order, $15 \div 4$, then $\times 8$.	S
2	J	$\angle H = \angle L$. $HJ = 6$, $JG = 7$, $GH = 8$. $LM = 24$, $KL = 18$. How long is MK ?	21 . Short with short: HJ with KL . Long with long: GH with LM . The factor is $18 \div 6 = 3$, so $MK = 7 \times 3 = 21$.	28: $LM \div HJ$ in letter order, $24 \div 6$, then $\times 7$.	E
3	N	$\angle Q = \angle T$. $RP = 10$, $PQ = 8$, $QR = 4$. $ST = 3$, $TU = 6$. How long is US ?	7.5 . Short with short: QR with ST . Long with long: PQ with TU . The factor is $3 \div 4 = 0.75$, so $US = 10 \times 0.75 = 7.5$.	15: $TU \div QR$ in letter order, $6 \div 4$, then $\times 10$.	S
4	K	$\angle R = \angle U$. $RS = 4$, $ST = 6$, $TR = 5$. $WU = 12$, $UV = 15$. How long is VW ?	18 . Short with short: RS with WU . Long with long: TR with UV . The factor is $12 \div 4 = 3$, so $VW = 6 \times 3 = 18$.	22.5: $UV \div RS$ in letter order, $15 \div 4$, then $\times 6$.	W
5	B	$\angle L = \angle P$. $KL = 10$, $LJ = 6$, $JK = 8$. $NP = 4.5$, $PM = 7.5$. How long is MN ?	6 . Short with short: LJ with NP . Long with long: KL with PM . The factor is $4.5 \div 6 = 0.75$, so $MN = 8 \times 0.75 = 6$.	10: $PM \div LJ$ in letter order, $7.5 \div 6$, then $\times 8$.	Z
6	Q	$\angle L = \angle U$. $NL = 8$, $LM = 4$, $MN = 7$. $WU = 10$, $UV = 20$. How long is VW ?	17.5 . Short with short: LM with WU . Long with long: NL with UV . The factor is $10 \div 4 = 2.5$, so $VW = 7 \times 2.5 = 17.5$.	35: $UV \div LM$ in letter order, $20 \div 4$, then $\times 7$.	T
7	G	$\angle F = \angle Z$. $EF = 12$, $FD = 6$, $DE = 10$. $ZX = 15$, $YZ = 7.5$. How long is XY ?	12.5 . Short with short: FD with YZ . Long with long: EF with ZX . The factor is $7.5 \div 6 = 1.25$, so $XY = 10 \times 1.25 = 12.5$.	25: $ZX \div FD$ in letter order, $15 \div 6$, then $\times 10$.	I
8	L	$\angle B = \angle Q$. $AB = 12$, $BC = 6$, $CA = 11$. $PQ = 9$, $QR = 18$. How long is RP ?	16.5 . Short with short: BC with PQ . Long with long: AB with QR . The factor is $9 \div 6 = 1.5$, so $RP = 11 \times 1.5 = 16.5$.	33: $QR \div BC$ in letter order, $18 \div 6$, then $\times 11$.	O

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
R	$\angle M = \angle T$. $KL = 11$, $LM = 12$, $MK = 6$. $TR = 18$, $ST = 9$. How long is RS ?	16.5 . Short with short: MK with ST . Long with long: LM with TR . The factor is $9 \div 6 = 1.5$, so $RS = 11 \times 1.5 = 16.5$.	33: $TR \div MK$ in letter order, $18 \div 6$, then $\times 11$.	I
D	$\angle Y = \angle K$. $YZ = 4$, $ZX = 8$, $XY = 6$. $JK = 10$, $KL = 15$. How long is LJ ?	20 . Short with short: YZ with JK . Long with long: XY with KL . The factor is $10 \div 4 = 2.5$, so $LJ = 8 \times 2.5 = 20$.	30: $KL \div YZ$ in letter order, $15 \div 4$, then $\times 8$.	W
A	$\angle A = \angle G$. $CA = 8$, $AB = 6$, $BC = 7$. $JG = 18$, $GH = 24$. How long is HJ ?	21 . Short with short: AB with JG . Long with long: CA with GH . The factor is $18 \div 6 = 3$, so $HJ = 7 \times 3 = 21$.	28: $GH \div AB$ in letter order, $24 \div 6$, then $\times 7$.	E
P	$\angle K = \angle F$. $HJ = 10$, $JK = 8$, $KH = 4$. $EF = 3$, $FD = 6$. How long is DE ?	7.5 . Short with short: KH with EF . Long with long: JK with FD . The factor is $3 \div 4 = 0.75$, so $DE = 10 \times 0.75 = 7.5$.	15: $FD \div KH$ in letter order, $6 \div 4$, then $\times 10$.	S
M	$\angle U = \angle N$. $TU = 5$, $US = 4$, $ST = 6$. $NL = 15$, $MN = 12$. How long is LM ?	18 . Short with short: US with MN . Long with long: TU with NL . The factor is $12 \div 4 = 3$, so $LM = 6 \times 3 = 18$.	22.5: $NL \div US$ in letter order, $15 \div 4$, then $\times 6$.	Z
E	$\angle E = \angle X$. $GE = 10$, $EF = 6$, $FG = 8$. $XY = 7.5$, $ZX = 4.5$. How long is YZ ?	6 . Short with short: EF with ZX . Long with long: GE with XY . The factor is $4.5 \div 6 = 0.75$, so $YZ = 8 \times 0.75 = 6$.	10: $XY \div EF$ in letter order, $7.5 \div 6$, then $\times 8$.	O
H	$\angle N = \angle B$. $MN = 8$, $NP = 4$, $PM = 7$. $AB = 10$, $BC = 20$. How long is CA ?	17.5 . Short with short: NP with AB . Long with long: MN with BC . The factor is $10 \div 4 = 2.5$, so $CA = 7 \times 2.5 = 17.5$.	35: $BC \div NP$ in letter order, $20 \div 4$, then $\times 7$.	T
F	$\angle U = \angle G$. $WU = 12$, $UV = 6$, $VW = 10$. $JG = 7.5$, $GH = 15$. How long is HJ ?	12.5 . Short with short: UV with JG . Long with long: WU with GH . The factor is $7.5 \div 6 = 1.25$, so $HJ = 10 \times 1.25 = 12.5$.	25: $GH \div UV$ in letter order, $15 \div 6$, then $\times 10$.	S

Other mistakes lead to no card at all. A group might turn the factor upside down, add the difference of two sides instead of multiplying, or pair the other two letters first with first. 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 taking the largest number, answers at most eight of the sixteen cards correctly.