

SCAVENGER HUNT



CLASSIFYING TRIANGLES ON THE COORDINATE PLANE

Which Side Is Longest? Triangles from Their Corners

Squares of side lengths from coordinates · the cards check the answers

FREE

ANSWER

61

Triangle XYZ has corners

$X(-5, 2)$, $Y(0, 3)$ and $Z(-1, 6)$.

Find the square of the length of its longest side.

Each side has two steps, across and up. Square each step, then add.

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 A E M K B H N*.
2. **Say this once:** *“Each card gives a triangle by its corners. Find the square of each side: across squared plus up squared. The largest of the three is your answer, like 34. Then walk to the card with that answer at the top.”*
3. **Each group writes one line per card.** Eight right answers bring the group back to its first card.

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 has a column for each of the three squares.
Answers	pages 12–13, for you only. Do not put them up in the room.

To say whether a triangle is acute, right or obtuse, a student must first find its longest side. From corners, the square of a side is $(\text{across})^2 + (\text{up})^2$, and the longest side has the largest square. No square root is needed. This hunt practices exactly that step, so every answer is a whole number.

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. Two mistakes take turns around the ring. Some students take the side with the biggest single step as the longest, but two middle steps can make a longer side. Others lose a minus sign when they subtract a negative coordinate. Each mistake lands on a card off the ring, and that card sends the group back to the card it got wrong.

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 italics under its question. It tells a group that arrived by a wrong answer what to check. A group that arrived by a right answer skips it. Guessing does not work: no single rule, such as taking the side with the biggest step, gets more than seven of the cards.



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

32

Triangle XYZ has corners

X(-1, 1), Y(-6, 6) and Z(-3, 0).

Find the square of the length of its longest side.

Is a minus sign lost anywhere? Subtracting a negative number adds it.

A

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ANSWER

85

Triangle XYZ has corners

X(-6, 6), Y(-4, -2) and Z(1, -1).

Find the square of the length of its longest side.

A negative step squares to a positive number. Every square is positive.

B

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ANSWER

61

Triangle XYZ has corners

X(-5, 2), Y(0, 3) and Z(-1, 6).

Find the square of the length of its longest side.

Each side has two steps, across and up. Square each step, then add.

C

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ANSWER

128

Triangle XYZ has corners

X(-1, 6), Y(6, -1) and Z(-2, 2).

Find the square of the length of its longest side.

Subtracting a negative number adds it. Check the signs in each step.

D

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ANSWER

50

Triangle XYZ has corners

$X(-3, 6)$, $Y(-4, -2)$ and $Z(1, 1)$.

Find the square of the length of its longest side.

The longest side has the largest square. Compare the squares, not square roots.

E

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ANSWER

45

Triangle XYZ has corners

$X(5, -3)$, $Y(4, 0)$ and $Z(0, -4)$.

Find the square of the length of its longest side.

The biggest single step does not always make the longest side. Compare all three squares.

F

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ANSWER

113

Triangle XYZ has corners

$X(-6, 6)$, $Y(-1, 1)$ and $Z(0, 4)$.

Find the square of the length of its longest side.

Is a minus sign lost anywhere? Copy every negative coordinate with its minus.

G

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ANSWER

98

Triangle XYZ has corners

$X(-1, 2)$, $Y(-6, -2)$ and $Z(2, -6)$.

Find the square of the length of its longest side.

Two small steps can beat one big step. Compare the squares, not the steps.

H

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ANSWER

37

Triangle XYZ has corners

X(6, 0), Y(5, -3) and Z(0, -6).

Find the square of the length of its longest side.

A step across zero counts both parts. From -6 to 2 is eight steps.

J

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ANSWER

72

Triangle XYZ has corners

X(0, -2), Y(-3, -6) and Z(4, 0).

Find the square of the length of its longest side.

Three corners make three sides. Is every side in the work?

K

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ANSWER

68

Triangle XYZ has corners

X(1, 1), Y(-3, -4) and Z(6, -6).

Find the square of the length of its longest side.

Which side has the biggest step? Its square is not always the largest square.

L

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ANSWER

65

Triangle XYZ has corners

X(0, 0), Y(-6, -6) and Z(1, -4).

Find the square of the length of its longest side.

Subtract in the same order for across and for up. Then square both steps.

M

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ANSWER

80

Triangle XYZ has corners

X(0, 0), Y(-3, -2) and Z(-6, 5).

Find the square of the length of its longest side.

Write the three squares in a row. The biggest square is the answer.

N

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ANSWER

58

Triangle XYZ has corners

X(-5, -5), Y(3, -1) and Z(-2, 0).

Find the square of the length of its longest side.

Find all three squares before choosing. The biggest step can mislead.

P

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ANSWER

52

Triangle XYZ has corners

X(-1, -1), Y(-5, 0) and Z(1, 5).

Find the square of the length of its longest side.

Check each subtraction with a minus sign. Taking away a negative number adds it.

Q

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ANSWER

53

Triangle XYZ has corners

X(-6, -5), Y(2, -4) and Z(-3, -1).

Find the square of the length of its longest side.

One big step and one small step can lose to two middle steps. Square, then add.

R

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Scavenger Hunt — where I went

The longest side

Name _____ Period _____ Date _____

For each card, find the square of each side: $(\text{across})^2 + (\text{up})^2$. Write the three squares. The largest one is the answer. Find the card with your answer at the top. A clean run is eight lines. Each card has a line in italics under its question. **If you are on a card because you went wrong, its line says what to check. If you were right, skip it.**

The square of a side: across is the difference of the two x -coordinates, and up is the difference of the two y -coordinates. Square each one and add. For example, from $(-2, 1)$ to $(3, -3)$ is 5 across and 4 down: $5^2 + 4^2 = 41$.
The answer is the largest of the three squares, a whole number like 34. No square root is needed.

Card letter	XY^2	YZ^2	ZX^2	Answer: the largest square
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Slopes argue about direction. What settles which side is longest?

Every number stands for a letter. Write the letter for each answer in the box above its number. Read the boxes you filled, left to right. **If they do not spell the answer, one of your answers is wrong.**

32 = D 37 = N 45 = T 50 = I 52 = D 53 = E 58 = A 61 = S 65 = T 68 = S 72 = A 80 = N 85 = C 98 = E 113 = I
 128 = C

32	37	45	50	52	53	58	61	65	68	72	80	85	98	113	128



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Scavenger Hunt — answers

For the teacher

The ring in order, with the answer found on each card. A group may begin anywhere on it. Wherever it begins, eight right answers bring it back to that card.

C (32) → A (50) → E (65) → M (72) → K (85) → B (98) → H (80) → N (61) → C

Slopes argue about direction. What settles which side is longest? The answer is *DISTANCE!* It is read along the boxes of the record sheet, which run from the smallest number to the largest.

Card	What the card asks	Answer, and why	The common wrong answer on this card, and why	Letter of its top
1 C	Corners X(-5, 2), Y(0, 3) and Z(-1, 6). Find the square of the longest side.	32. $XY^2 = 26$, $YZ^2 = 10$, $ZX^2 = 32$. The largest is $ZX^2 = 32$.	52: one minus sign is lost, X's $x = -5$ written as 5, which makes the largest square 52.	S
2 A	Corners X(-1, 1), Y(-6, 6) and Z(-3, 0). Find the square of the longest side.	50. $XY^2 = 50$, $YZ^2 = 45$, $ZX^2 = 5$. The largest is $XY^2 = 50$.	45: YZ has the biggest single step (6), so a group takes it as the longest. But $3^2 + 6^2 = 45$, while XY gives $5^2 + 5^2 = 50$.	D
3 E	Corners X(-3, 6), Y(-4, -2) and Z(1, 1). Find the square of the longest side.	65. $XY^2 = 65$, $YZ^2 = 34$, $ZX^2 = 41$. The largest is $XY^2 = 65$.	113: one minus sign is lost, X's $x = -3$ written as 3, which makes the largest square 113.	I
4 M	Corners X(0, 0), Y(-6, -6) and Z(1, -4). Find the square of the longest side.	72. $XY^2 = 72$, $YZ^2 = 53$, $ZX^2 = 17$. The largest is $XY^2 = 72$.	53: YZ has the biggest single step (7), so a group takes it as the longest. But $7^2 + 2^2 = 53$, while XY gives $6^2 + 6^2 = 72$.	T
5 K	Corners X(0, -2), Y(-3, -6) and Z(4, 0). Find the square of the longest side.	85. $XY^2 = 25$, $YZ^2 = 85$, $ZX^2 = 20$. The largest is $YZ^2 = 85$.	37: one minus sign is lost, Y's $y = -3$ written as 3, which makes the largest square 37.	A
6 B	Corners X(-6, 6), Y(-4, -2) and Z(1, -1). Find the square of the longest side.	98. $XY^2 = 68$, $YZ^2 = 26$, $ZX^2 = 98$. The largest is $ZX^2 = 98$.	68: XY has the biggest single step (8), so a group takes it as the longest. But $2^2 + 8^2 = 68$, while ZX gives $7^2 + 7^2 = 98$.	C
7 H	Corners X(-1, 2), Y(-6, -2) and Z(2, -6). Find the square of the longest side.	80. $XY^2 = 41$, $YZ^2 = 80$, $ZX^2 = 73$. The largest is $YZ^2 = 80$.	128: one minus sign is lost, Y's $y = -2$ written as 2, which makes the largest square 128.	E
8 N	Corners X(0, 0), Y(-3, -2) and Z(-6, 5). Find the square of the longest side.	61. $XY^2 = 13$, $YZ^2 = 58$, $ZX^2 = 61$. The largest is $ZX^2 = 61$.	58: YZ has the biggest single step (7), so a group takes it as the longest. But $3^2 + 7^2 = 58$, while ZX gives $6^2 + 5^2 = 61$.	N

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 to the card it got wrong and tries it again.

Card	What the card asks	Answer, and why	The common wrong answer on this card, and why	Letter of its top
Q	Corners $X(-1, -1)$, $Y(-5, 0)$ and $Z(1, 5)$. Find the square of the longest side.	61. $XY^2 = 17$, $YZ^2 = 61$, $ZX^2 = 40$. The largest is $YZ^2 = 61$.	—	D
F	Corners $X(5, -3)$, $Y(4, 0)$ and $Z(0, -4)$. Find the square of the longest side.	32. $XY^2 = 10$, $YZ^2 = 32$, $ZX^2 = 26$. The largest is $YZ^2 = 32$.	—	T
G	Corners $X(-6, 6)$, $Y(-1, 1)$ and $Z(0, 4)$. Find the square of the longest side.	50. $XY^2 = 50$, $YZ^2 = 10$, $ZX^2 = 40$. The largest is $XY^2 = 50$.	—	I
R	Corners $X(-6, -5)$, $Y(2, -4)$ and $Z(-3, -1)$. Find the square of the longest side.	65. $XY^2 = 65$, $YZ^2 = 34$, $ZX^2 = 25$. The largest is $XY^2 = 65$.	—	E
J	Corners $X(6, 0)$, $Y(5, -3)$ and $Z(0, -6)$. Find the square of the longest side.	72. $XY^2 = 10$, $YZ^2 = 34$, $ZX^2 = 72$. The largest is $ZX^2 = 72$.	—	N
L	Corners $X(1, 1)$, $Y(-3, -4)$ and $Z(6, -6)$. Find the square of the longest side.	85. $XY^2 = 41$, $YZ^2 = 85$, $ZX^2 = 74$. The largest is $YZ^2 = 85$.	—	S
D	Corners $X(-1, 6)$, $Y(6, -1)$ and $Z(-2, 2)$. Find the square of the longest side.	98. $XY^2 = 98$, $YZ^2 = 73$, $ZX^2 = 17$. The largest is $XY^2 = 98$.	—	C
P	Corners $X(-5, -5)$, $Y(3, -1)$ and $Z(-2, 0)$. Find the square of the longest side.	80. $XY^2 = 80$, $YZ^2 = 26$, $ZX^2 = 34$. The largest is $XY^2 = 80$.	—	A

Other mistakes lead to no card. A group might write the square of a side that is not the longest, or lose a minus sign anywhere else, one sign or two. Its answer is then not the number at the top of any card, and the group knows to check its work.