EDSTAR ANALYTICS | Deep Dive 5
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Distance, the Pythagorean Theorem on the Grid

Draw the right triangle under each slanted segment. Across, up, square, add, square root. Give the exact square root and the decimal to the hundredth.

Name _____ Date _____

Words we use

say the math word, then the plain English

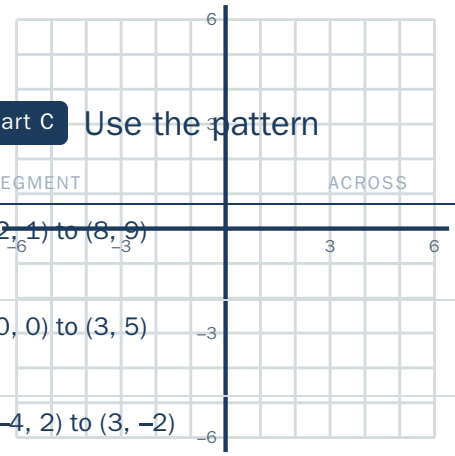
WORD	PLAIN ENGLISH	WHAT YOU DO
Distance	How long a segment is. Always positive.	Draw the right triangle, then square, add, square root.
Segment	The straight piece between two points, its endpoints.	Name it by its endpoints, like AB.
Legs	The two sides of a right triangle that make the square corner.	On the grid: across and up. You can count them.
Hypotenuse	The longest side of a right triangle, across from the right angle.	The slanted segment is the hypotenuse.
Pythagorean theorem	$a^2 + b^2 = c^2$ for any right triangle.	Legs squared and added give the hypotenuse squared.
Square root	The number that, multiplied by itself, gives the number inside. It undoes squaring.	Give it exactly and as a decimal to the hundredth.

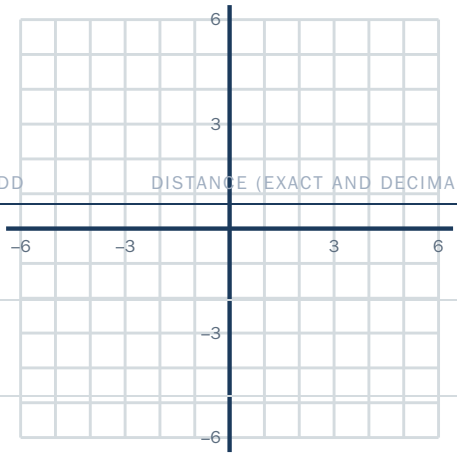
Part A Count them

SEGMENT	SAME X'S OR SAME Y'S?	DISTANCE
(2, 3) to (9, 3)		
(4, –1) to (4, 5)		
(–6, 2) to (1, 2)		

Part B Draw the triangle

Plot each segment on the grid, draw the right triangle under it, and label the legs. Then square, add, and take the square root.





Part C Use the pattern

SEGMENT	ACROSS	UP	SQUARE AND ADD	DISTANCE (EXACT AND DECIMAL)
(2, 1) to (8, 9)				
(0, 0) to (3, 5)				
(–4, 2) to (3, –2)				
(–2, 4) to (3, –1)				
(1, 2) to (4, 6)				
(5, –3) to (–1, –3)				
(–3, –1) to (2, 5)				

Part D Two questions

1. Compute (4, 6) to (1, 2) subtracting in that order. Why do you get the same distance as (1, 2) to (4, 6)?

2. Why does the formula end with a square root? Use the word inverse or undo.

Part E Slope and distance, side by side

For the segment from (1, 2) to (4, 6):

1. Slope (rise over run, stacked):

2. Distance:

3. What do the two tools do with the same two differences?

Part F Exit ticket

1. Distance from (2, 1) to (8, 9).

2. Distance from (–3, –1) to (2, 5), exact and to the hundredth.

3. Why does the order of the points not matter?

Answer key

Part A. Same y's, 7. Same x's, 6. Same y's, 7.

Part B. 3, 4, 25, 5. 5, 6, 61, root 61 ≈ 7.81.

Part C. 6, 8, 100, 10. 3, 5, 34, root 34 ≈ 5.83. 7, 4, 65, root 65 ≈ 8.06. 5, 5, 50, root 50 ≈ 7.07. Same y's: 6.

Part D. 1. Legs –3 and –4 square to 9 and 16: squaring removes the sign. 2. The theorem gives c squared; the square root is the inverse of squaring and undoes it.

Part E. 1. 4 over 3. 2. 5. 3. Slope divides the differences (rise over run); distance squares and adds them.

Part F. 1. 10. 2. Root 61 ≈ 7.81. 3. Squaring a negative gives a positive.