Geometry Unit 2 Performance Task

CONTEXT: A rich mathematician named Mathew Rich is looking to create a geometric garden. He is willing to pay $1,000,000 to the company who is able to meet his design expectations to the fullest extent. He is opening up the competition to several companies. The company you work for wants to make sure you are capable of meeting the intense design requirements of the project by first performing a few simple tasks before you are put on the project.

<u>TASK #1</u>
Your first task will prove that you can work with parallel and perpendicular lines and recognize the shapes they create.

1) On graph paper below create a set of parallel lines. Connect these parallel lines with two lines that are perpendicular to the original lines.

Confirm that you have parallel and perpendicular lines by finding the slope of each line here.
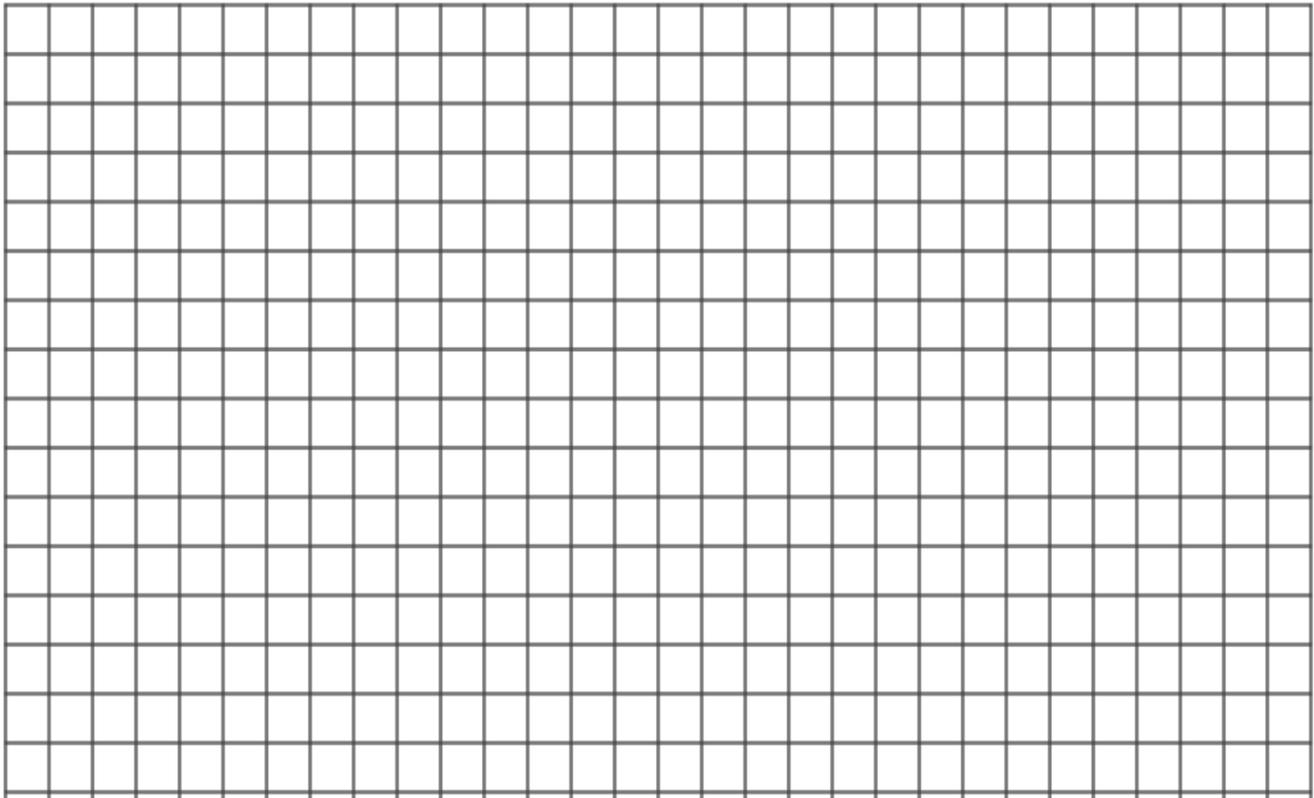
2) On graph paper below create a set of parallel lines. Connect those lines with two lines that are **NOT** perpendicular to the original lines, but are parallel to each other.

Confirm that you have parallel lines by finding the slope of your original lines here.

Find the slope of the two connecting lines. Are they parallel? How do you know?
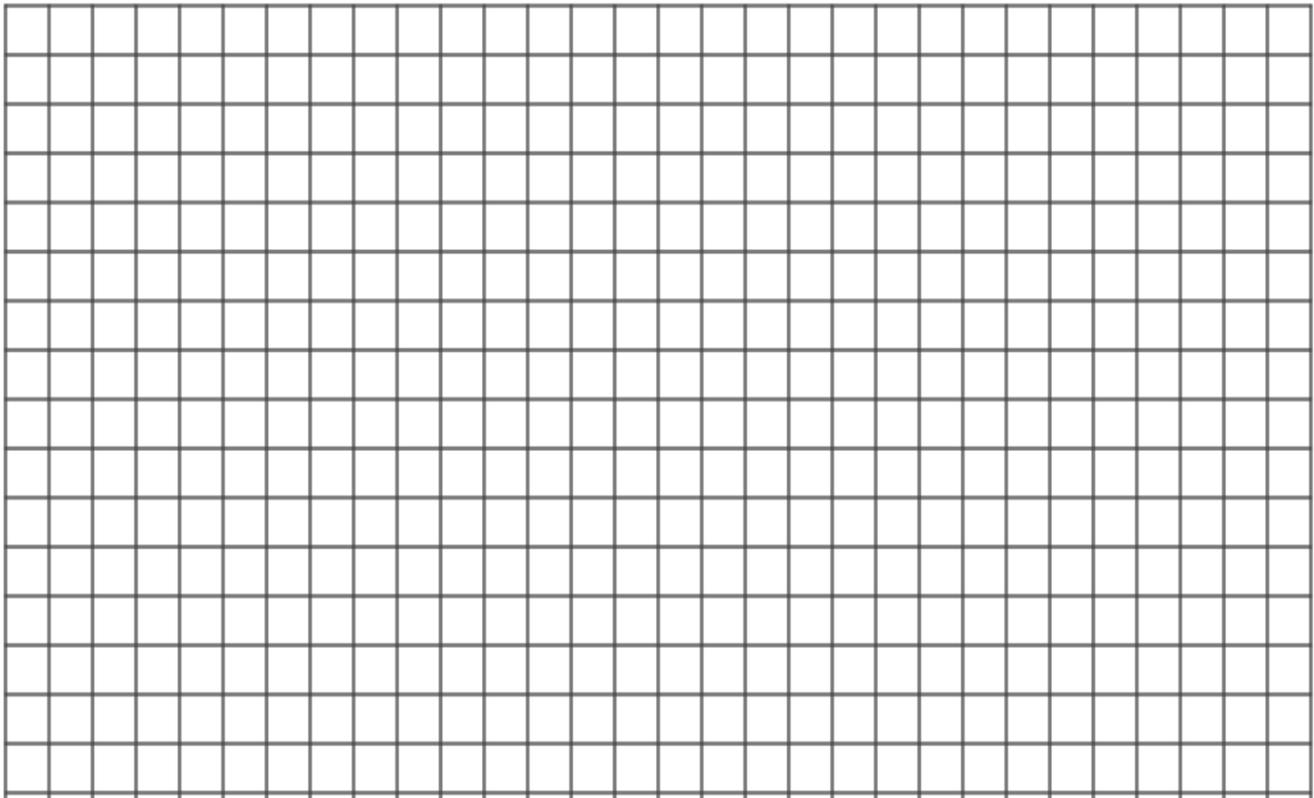
What shapes have you created in your two drawings? What properties can you identify of these shapes?

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TASK #2

Your second task will prove that you can work with diagonals, which are a part of the directions given in the garden project.

Use the drawings you created from the last task or recreate the same drawings.
Extend the parallel lines beyond the limits of the shapes.

Take each drawing and draw in a diagonal connecting two of the parallel lines. Make the diagonal extend beyond the parallel lines.

Measure all of the angles created by the diagonal, including those that are outside the shape, with a protractor.

What do you notice about the angle measures? Which ones are related to each other?

TASK #3

Your company now believes you are competent enough to work on the project they are competing for at Mathew Rich's garden. In order to allow companies to work specifically on his design Mathew Rich is asking that each company demonstrate their capabilities of working with basic quadrilaterals, a key building block in his desired garden.

1) Create a parallelogram that has a diagonal of length 5, has a vertex at the point (4 , 5) and label the other 3 vertices. Show your work or justifications on a separate page you will attach.

(0,0)
PROVE that this is a parallelogram.

STATEMENTS	REASONS

2) Create an isosceles trapezoid which includes the point (0,0).
Label the other vertices with **LETTERS and ZEROES ONLY**   for example (A , 0)
Show your work or justifications on a separate page you will attach.
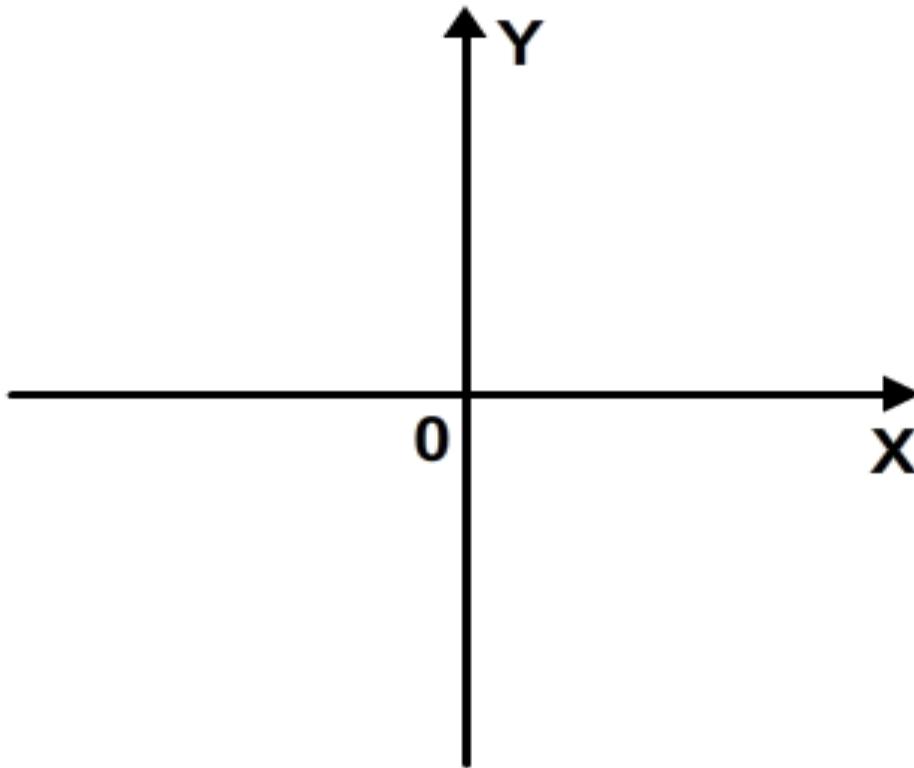
PROVE that this is an isosceles trapezoid.

STATEMENTS	REASONS

TASK #4

Finally you have "***PROVEN***" yourself worthy to attempt to design the garden of Mathew Rich. Below are the specifications for the garden on a coordinate plane which include 4 parallelogram plots and 7 trapezoidal plots. Create the garden design on the graph paper which is attached.

1) First create a parallelogram plot, ABCD with points A at (19 , 1) , B at (14 , 3) , D at (19 , 11) and a diagonal length AC of 13.

Show your work/justification here

2) Next create a parallelogram plot, congruent to ABCD, named EFGH with point E at the midpoint of BC, and C at the midpoint of EH.

Show you work/justification here

3) Then create an isosceles trapezoidal plot, GHJK, which shares a side GH with the previous parallelogram, has point J at (19 , 21) and the midpoint of segment GK is at (14, 23).

Show your work/justification here

4) Next create an isosceles trapezoid LMNO congruent to GHJK containing points L (14,23) , M (14,28) and N (9,31)

Show your work/justification here

5) Create 5 more isosceles trapezoidal plots congruent to LMNO that are sharing isosceles edges. Do so using the following points.
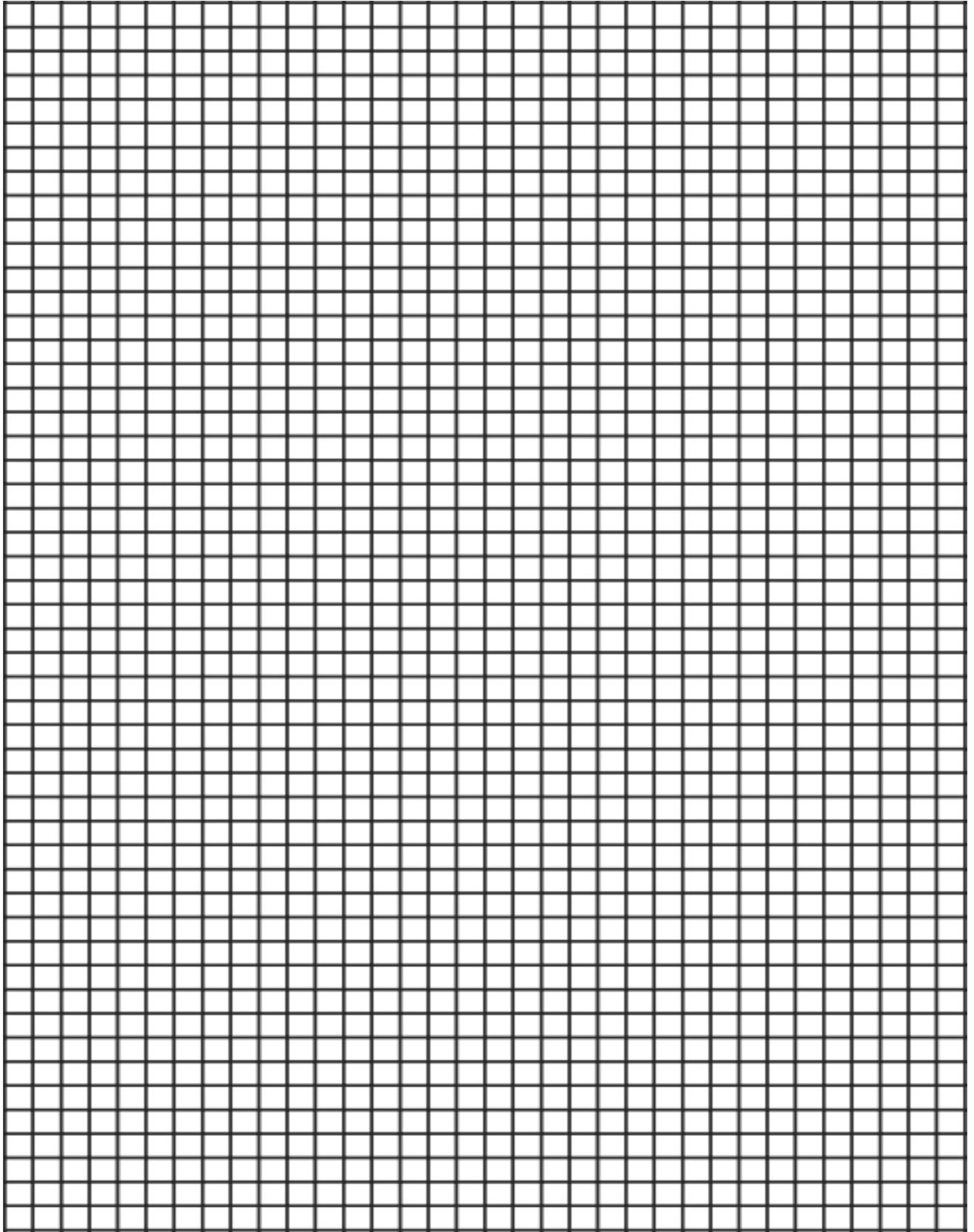P = (4 , 41) ,   Q = (9 , 38) , R = (14 , 41) , S = (14 , 47) ,
T = (19 , 38) , U = (24, 41) V = (19, 31) , W = (24, 29)
Show your work/justification here

6) Finally create two rhombi plots with one that has a vertex at the midpoint of GF, and the other with a vertex at point D.

Show your work/justification here

Last, color in your diagram lightly so your work is visible and state the image the design has created.

(0 , 0)