Lattice Squares [1]

A lattice point is a point where there is a peg on the geoboard, or a point where grid lines cross on graph paper, or a point marked with a dot on lattice paper.
A lattice square is a square with all vertices at lattice points.

Counting Lattice Squares

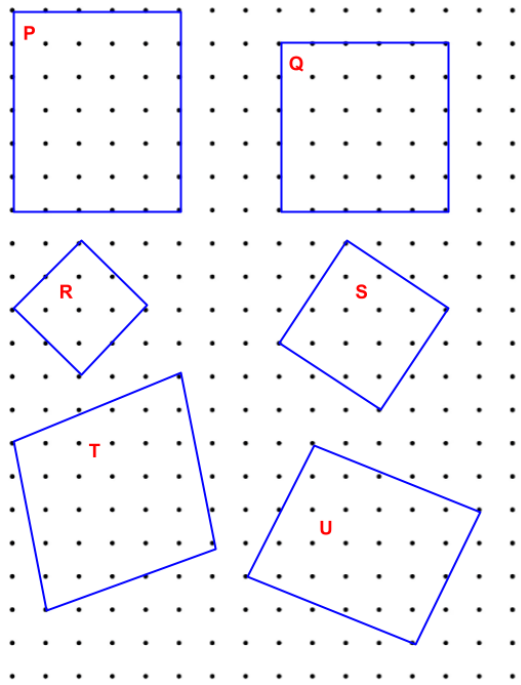
1. How many lattice squares can you find on this 3×3 grid of dots?

2. How many lattice squares can you find on this 3×3 grid of dots?

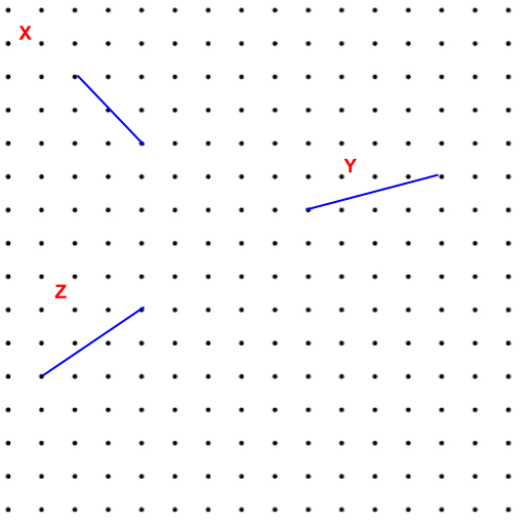
[1] From Geometry: A Guide for Teachers Mathematical Circles Library by Judith and Paul Sally.

Drawing Lattice Stars

3. Which of the shapes below are squares?

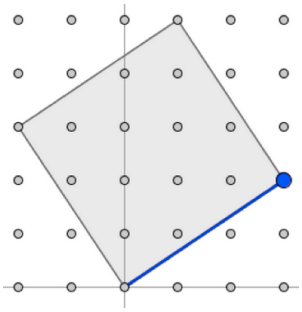


4. For each line segment below, complete it to form a square.



Areas of Lattice Squares

5. If the dots are spaced 1 cm apart, what is the area of this square?



6. Assume each square of the graph paper has area 1. Draw a lattice square with
   (a) area 1
   (b) area 4
   (c) area 36

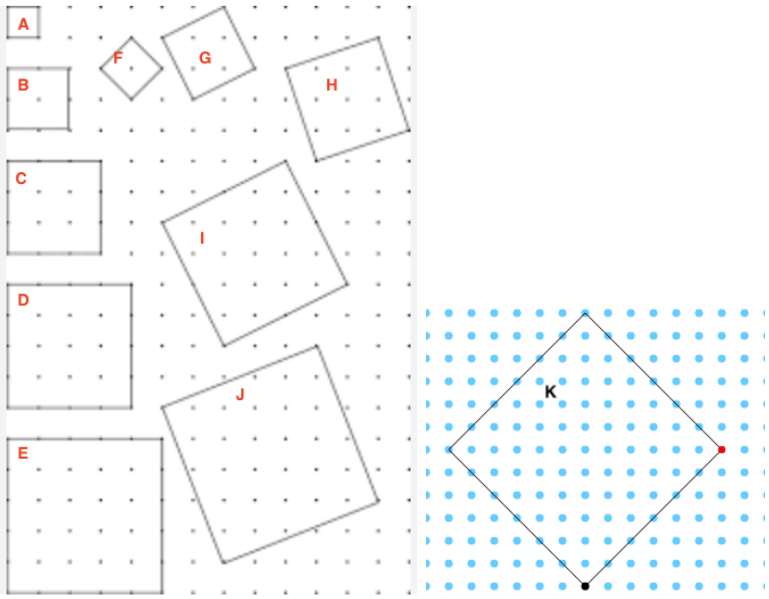
7. Is it possible to draw a lattice square with
   (a) area 2?
   (b) area 3?
   (c) area 5?

8. What numbers are possible for the areas of lattice squares?

Area	Possible?	Area	Possible?	Area	Possible?
1		11		21	
2		12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Lattice Squares and Counting Dots

9. For each of the following lattice squares, count the lattice points on the inside of the square and the lattice points on the boundary of the square, including the 4 corners. Also find the square's area.



Square	Interior Dots (I)	Boundary Dots (B)	Area (A)
A			
B			
C			
D			
E			
F			
G			
H			
I			
J			

10. What do you notice about the number of dots and the area?

11. Does this pattern hold for other shapes, like lattice rectangles and lattice triangles?