Two-Dimensional Geometry
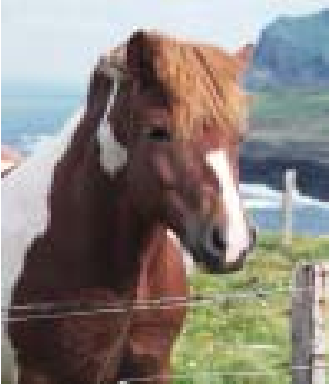
**1.** Old MacDonald had a farm.
He used 56-m of fencing to make a parallelogram-shaped
paddock with an area of 180 m^2 for his horse.
What were the dimensions of the paddock?

Draw the parallelogram on grid paper.
Change the lengths of the sides until you have a parallelogram
that matches the measurements.

2. Ahmed has a supply of patio blocks that are 50 cm long and 25 cm wide.
He wants to make a path that is 50 cm wide.
How many different ways can he make a path
• 25 cm long
• 50 cm long
• 75 cm long
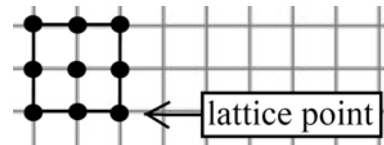Use sketches and a table to record your answers.

50 cm

25 cm
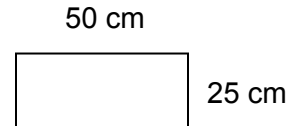
Width of Path	Number of Ways to Make Path

Continue the table until you can find the pattern.
Use your pattern to find the number of ways that he can make a path 10 m long
(hint: 100 cm = 1 m).

3. A lattice point is any point on a grid that has whole
numbers as coordinates.

lattice point

Pick's theorem says that you can calculate the area of a
shape that has lattice points as vertices.
Count the number of lattice points inside the shape, and call it i.
Count the number of lattice points on the boundary, and call it b.
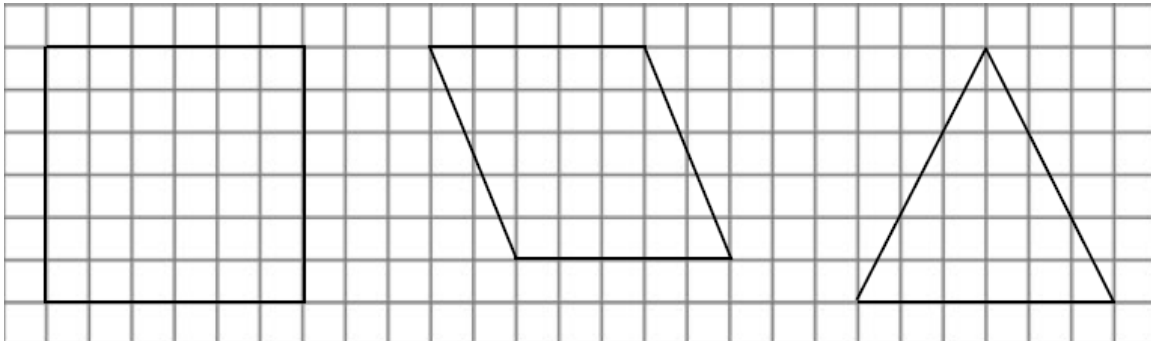
The formula for area, is $A = i + 0.5b - 1$.

For example, in the square above, there is 1 lattice point inside the shape, and there are 8 lattice points on the boundary.

$A = i + 0.5b - 1$
$\quad = 1 + 0.5(8) - 1$
$\quad = 1 + 4 - 1$
$\quad = 4$

Use order of operations.
Multiply before you add or subtract.

Calculate the area for each shape using Pick's theorem.

Calculate the area for each shape using formulas you already know.
Area of square or parallelogram $= b \times h$
Area of triangle $= b \times h \div 2$

Are your calculations the same?