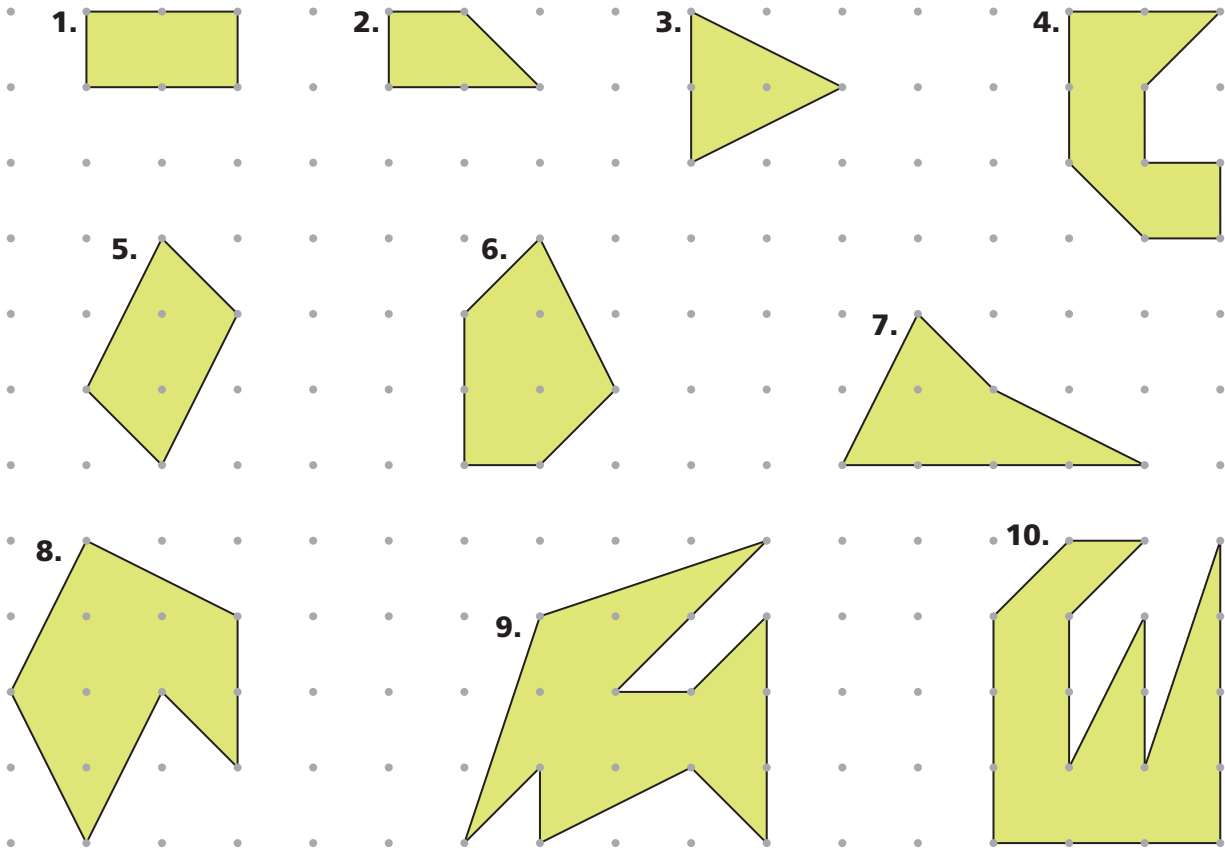


1.3 Finding Areas

Below are some park designs submitted to the Euclid City Council. To determine costs, the council needs to know the area of each park.



Problem 1.3 Finding Areas

Consider the horizontal or vertical distance between two adjacent dots to be 1 unit.

- Find the area of each figure.
- Find the area of one of the square parks you suggested in Problem 1.2.
- Describe the strategies you used in Questions A and B.

ACE Homework starts on page 12.

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Investigation

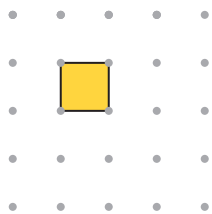
2

Squaring Off

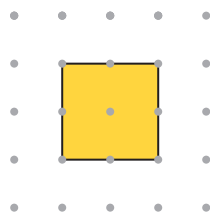
In this investigation, you will explore the relationship between the side lengths and areas of squares and use that relationship to find the lengths of segments on dot grids.

2.1 Looking for Squares

You can draw squares with different areas by connecting the points on a 5 dot-by-5 dot grid. Two simple examples follow.



Area = 1 square unit



Area = 4 square units

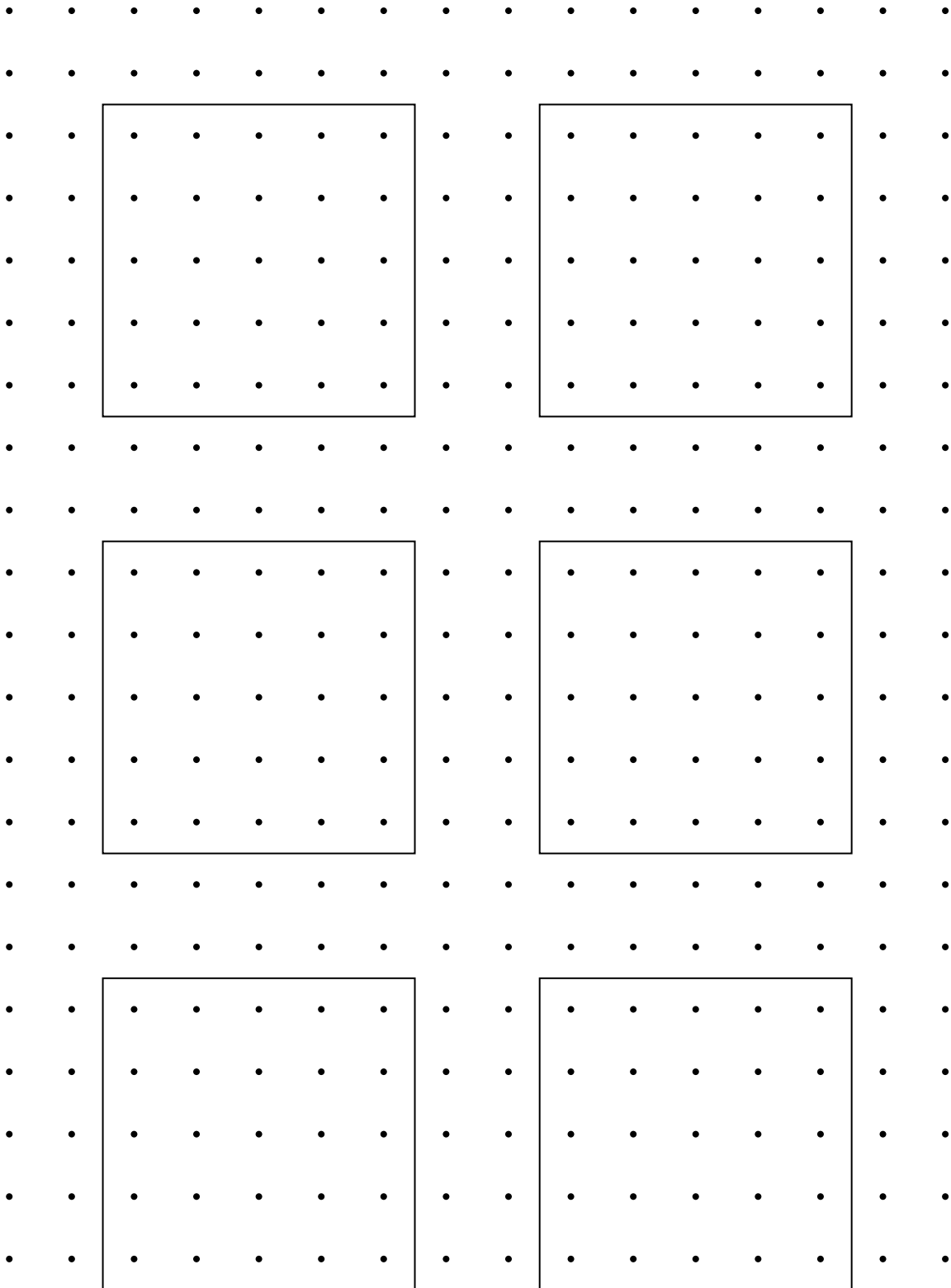
In this problem, you will explore other possible areas.

Problem 2.1 Looking for Squares

- On 5 dot-by-5 dot grids, draw squares of various sizes by connecting dots. Draw squares with as many different areas as possible. Label each square with its area. Include at least one square whose sides are not horizontal and vertical.
- Analyze your set of squares and describe the side lengths you found.

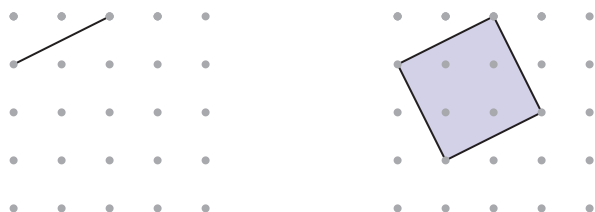
AC Homework starts on page 23.

Enclosed 5 Dot-by-5 Dot Grids



2.3 Using Squares to Find Lengths

You can use a square to find the length of a segment connecting dots on a grid. For example, to find the length of the segment on the left, draw a square with the segment as a side. The square has an area of 5 square units, so the segment has length $\sqrt{5}$ units.



Problem 2.3 Using Squares to Find Lengths

- A. 1.** On 5 dot-by-5 dot grids, draw line segments with as many different lengths as possible by connecting dots. Label each segment with its length. Use the $\sqrt{\quad}$ symbol to express lengths that are not whole numbers. (**Hint:** You will need to draw squares that extend beyond the 5-dot-by-5-dot grids.)
- 2.** List the lengths in increasing order.
- 3.** Estimate each non-whole number length to one decimal place.
- B.** Ella says the length of the segment at the left below is $\sqrt{8}$ units. Isabel says it is $2\sqrt{2}$ units. Are both students correct? Explain.



- C. 1.** Question B gives two ways of expressing the exact length of a segment. Express the exact length of the segment at the right above in two ways.
- 2.** Can you find a segment whose length cannot be expressed in two ways as in Question B?

ACE Homework starts on page 23.

Enclosed 5 Dot-by-5 Dot Grids

