Inquiry STEMs from Mystery!

Short Mystery You Solve with Math…

Corralling the Problem

Nicole's little sister Valerie loves play sets. She has several of them set up in their family room, which her family calls Valerie Land. There are houses, a petting zoo, a bakery and lotsof animals. Her favorite animals are horses.

At her birthday, she got several sets of horses, including one set with 40 plastic fence pieces, each one inch long, that could be snapped together to make a straight line or a right angle. After the guests went home, Valerie started to play with the fence.

"I hope this corral is big enough to hold all of my horses," she told Nicole.

Nicole knew that would be a challenge because Valerie had a lot of horses.

Valerie arranged the fence pieces into a rectangle that was much longer on two of the sides than on the other two, but she couldn't fit all the horse figures inside of it. "We don't have enough fence pieces," she said. "We need to buy more."

"Before we do that, let me try to help," Nicole said, starting to rearrange the pieces.

"What difference will that make?" Valerie asked. "We have the same number of pieces no matter what shape we make."

Mystery No. 8 (page 31) from
One Minute Mysteries: 65 Short Mysteries You Solve With Math!

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Corralling the Problem Activity

In Corralling the Problem, Valerie makes her fence out of 40, 1''pieces that can be snapped together to make a straight line or a right angle.

1. What is your guess about which shape would give the horses the most room?

_____

Let's compare an area of 3 different shapes: A square, a triangle, and a rectangle.

- *Here is the formula for calculating the area of a square or a rectangle:*
  Area = L x W

- *Here is the formula for calculating the area of a triangle:*
  Area = (B x H) ÷ 2

2. What is the area of a square corral you could make with 40 1'' pieces?

_____

3. What is the area of a rectangular corral you could make with 40 1'' pieces?

_____

4. If the pieces could make angles necessary for a triangle, what is the area of a triangular corral you could make with 40 1'' pieces?

_____

5. What is the shape that will give Valerie's horses the most room to move around?

_____

6. Why does this shape work better for her than the other shapes?

_____

_____

_____

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Answer to…

Corralling the Problem

"Let's arrange the fence pieces into a square," Nicole said. "We have 40 pieces, so a square would have 10 pieces on each side. The area of a square is the width times the length, 10 times 10, or 100 square inches.

"Let's say you make a rectangle that's as close as you can get to a square. That would be 9 pieces in one direction and 11 in the other. That gives an area of 99 square inches—9 times 11. That's not much a difference, but 99 is smaller than 100. Or, a rectangle that's 8 pieces one way and 12 the other would have an area of 96 square inches—8 times 12. If you go all the way to a rectangle that's 1 piece one way and 19 pieces the other way, you have an area of only 19 square inches—1 times 19. So a square is the shape that will enclose the most space. Let's see if all of your horses can fit into a square."

They did fit. As Nicole watched, she thought to herself, I didn't want to confuse her, but a square is actually a type of recntangle, since a rectangle is a four-sided object with all straight lines, four right angles, and opposite sides of equal length. A square is a kind of rectangle where all four sides are the same length. I used the word rectangle in the sense that peope usually think about it, where one pair of sides is longer than the other pair.

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