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Lesson 4: Rabbit Run
Solidify Understanding

Learning Focus

Model a story context with table, graph, and equation.

Identify features of a function from a graph.

Are all quadratic functions increasing?

Are all quadratic functions discrete?

Open Up the Math
Launch, Explore, Discuss

Misha has a new rabbit that she named Wascal. She wants to build Wascal a pen so that the rabbit has space to move around safely. Misha has purchased a 72 foot roll of fencing to build a rectangular pen.
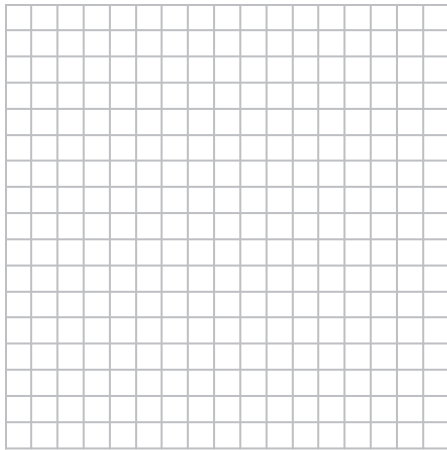
1. If Misha uses the whole roll of fencing, what are some of the possible dimensions of the pen?

2. If Misha wants a pen with the largest possible area, what dimensions should she use for the sides? Justify your answer.

3. Write a model for the area of the rectangular pen in terms of the length of one side. Include both an equation and a graph.

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4. What kind of function is this? How do you know?

5. How does this function compare to the quadratic function in *I Rule*?

Ready for More?

If the rabbit pen does not need to be a rectangle, is there a way to get more area with 72 feet of fencing around the perimeter?

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Takeaways

Is this a quadratic function?

Vocabulary

- **vertex of a parabola**

Bold terms are new in this lesson.

Lesson Summary

In this lesson we examined a quadratic function that was a model for area but had many different features than those we have seen previously. We learned that all quadratic functions have a linear rate of change and constant second difference, but some may be continuous and have intervals of increase and decrease depending on the domain.

◀ Retrieval

Find the slope between the given points.

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1. $(5, 4), (-3, 20)$ **2.** $(-7, 12), (-10, 14)$

Determine which function will be changing faster for large values of x on each graph.

3.

4.