

MAT.04.CR.2.000MD.A.062 Claim 2

Sample Item Id:	MAT.04.CR.2.000MD.A.062
Grade:	04
Primary Claim:	Claim 2: Problem Solving Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.
Secondary Claim(S):	Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.
Primary Content Domain:	Measurement and Data
Secondary Content Domain(S):	
Assessment Target(S):	2 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace. 2 D: Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas). 1 I: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
Standard(S):	4.MD.3
Mathematical Practice(S):	1, 2, 3, 4, 5, 6
DOK:	2
Item Type:	CR
Score Points:	4
Difficulty:	M
Key:	See Sample Top-Score Response.
Stimulus/Source:	
Target-Specific Attributes (E.G., Accessibility Issues):	
Notes:	TE template: Drop Downs, Vertex-Based Quadrilaterals

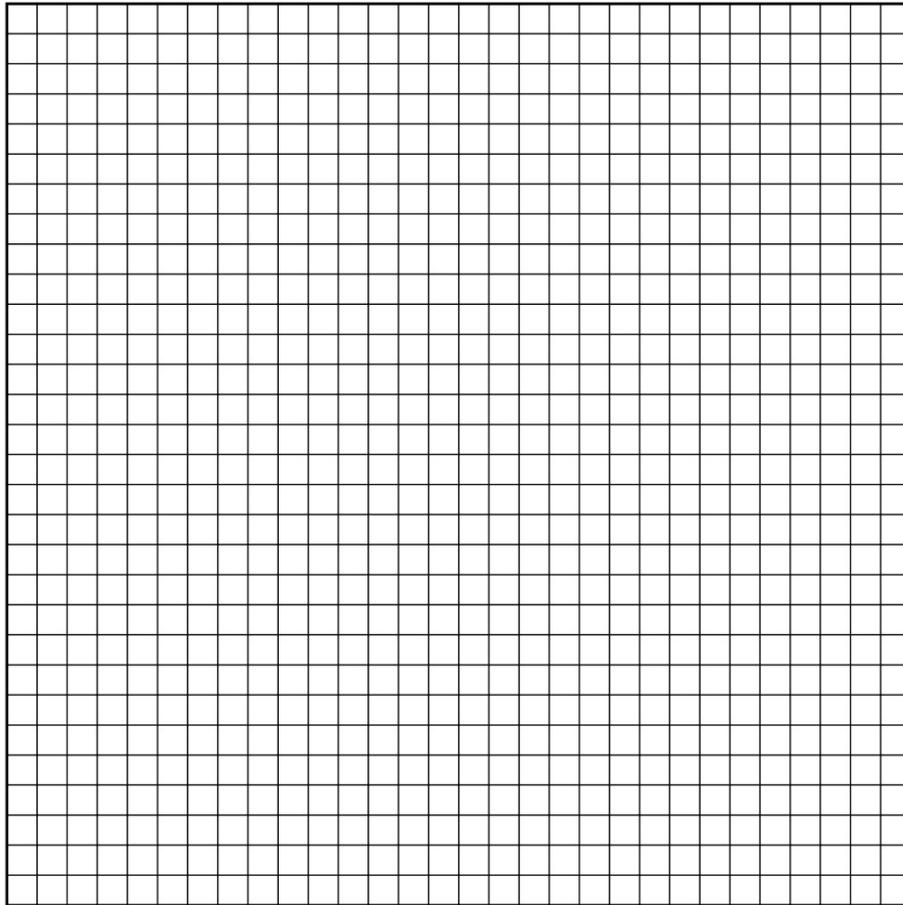
Ms. McCrary wants to make a rabbit pen in a section of her lawn. Her plan for the rabbit pen includes the following:

- It will be in the shape of a rectangle.
- It will take 24 feet of fence material to make.
- Each side will be longer than 1 foot.
- The length and width will measure whole feet.

Part A

Draw 3 **different** rectangles that can each represent Ms. McCrary's rabbit pen. Be sure to use all 24 feet of fence material for each pen.

Use the grid below. Click the places where you want the corners of your rectangle to be. Draw one rectangle at a time. If you make a mistake, click on your rectangle to delete it. Continue as many times as necessary.

**Key**

□ = 1 square foot

Use your keyboard to type the length and width of each rabbit pen you draw. Then type the area of each rabbit pen. Be sure to select the correct unit for each answer.

[Students will input length, width, and area for each rabbit pen. Students will choose unit from drop down menu.]

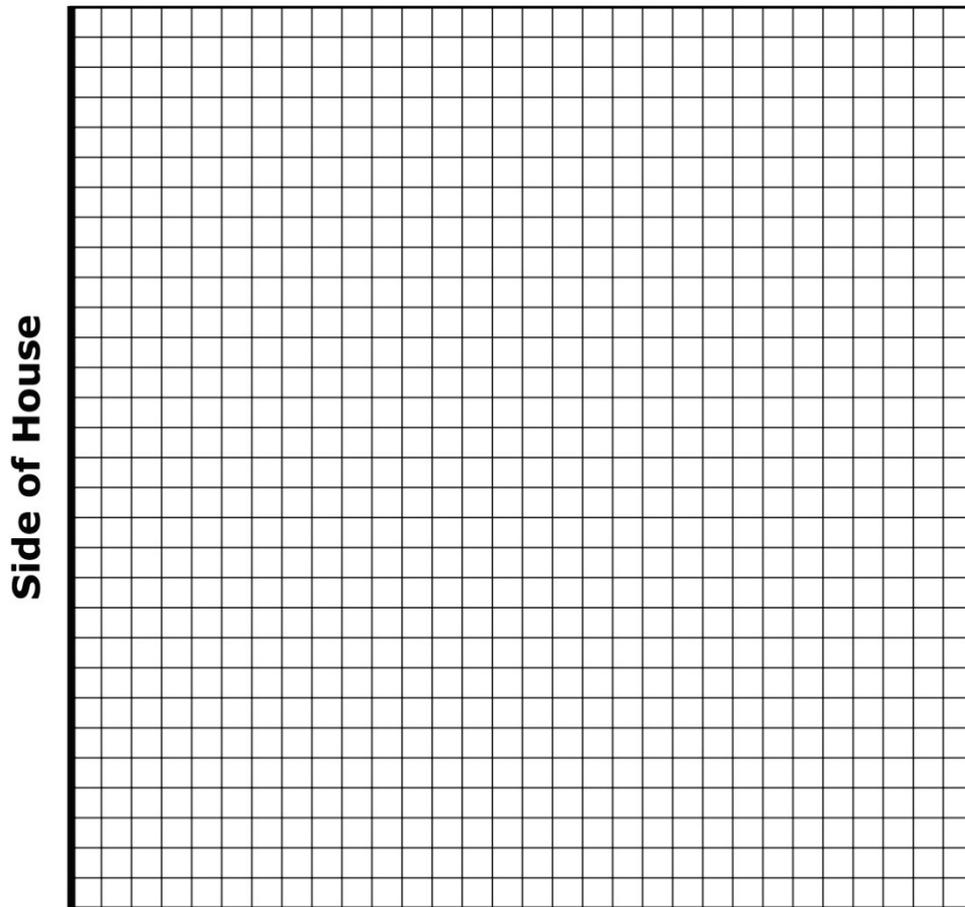
Pen 1Length: (feet, square feet)Width: (feet, square feet)Area: (feet, square feet)**Pen 2**Length: (feet, square feet)Width: (feet, square feet)Area: (feet, square feet)**Pen 3**Length: (feet, square feet)Width: (feet, square feet)Area: (feet, square feet)

Part B

Ms. McCrary wants her rabbit to have more than 60 square feet of ground area inside the pen. She finds that if she uses the side of her house as one of the sides of the rabbit pen, she can make the rabbit pen larger.

- Draw another rectangular rabbit pen.
- Use all 24 feet of fencing for 3 sides of the pen.
- Use one side of the house for the other side of the pen.
- Make sure the ground area inside the pen is greater than 60 square feet.

Use the grid below. Click the places where you want the corners of your rectangle to be. If you make a mistake, click on your rectangle to delete it.

**Key** = 1 square foot

Use your keyboard to type the length and width of your new rabbit pen you draw. Then type the area of the rabbit pen. Be sure to select the correct unit for each answer.

Length: (feet, square feet)Width: (feet, square feet)Area: (feet, square feet)

Sample Top-Score Response:

Draws 3 different rectangles with a perimeter of 24 feet (2x10, 3x9, 4x8, 5x7, 6x6).

Rabbit Pen 1

Length: 4 feet Width: 9 feet

Area: 36 square feet

Rabbit Pen 2

Length: 2 feet Width: 10 feet

Area: 20 square feet

Rabbit Pen 3

Length: 3 feet Width: 9 feet

Area: 27 square feet

Using the house as one side of the pen, draws a rectangle that has an area greater than 60 square feet.

Length: 4 feet Width: 16 feet

Area: 64 square feet

Scoring Rubric:

Responses to this item will receive 0-4 points, based on the following:

4 points: The student has thorough understanding of applying area and perimeter formulas for rectangles in real-world and mathematical problems. This is shown by completing the following:

- Draws 3 different rectangles with a perimeter of 24 (2x10, 3x9, 4x8, 5x7, 6x6).
- Writes the length and width of each rectangle correctly with the corresponding area (2x10=20, 3x9=27, 4x8=32, 5x7=35, 6x6=36).
- Using the house as one side of the pen, draws a rectangle that has a greater area than each of the other three that were drawn.
- Labels length, width, and area appropriately. (NOTE: The second dimension is the side opposite the house: ~~1x22=22~~, ~~2x20=40~~, ~~3x18=54~~, 4x16=64, 5x14=70, 6x12=72, 7x10=70, 8x8=64, 9x6=54, ~~10x4=40~~. Crossed-out dimensions will not yield an area greater than 60 square feet, but these could be counted for partial credit.)

3 points: The student has understanding of applying area and perimeter formulas for rectangles in real-world and mathematical problems. This is shown by completing the following: Three of the above. **OR** Draws and labels at least 2 rectangles correctly in the first and second bullets, correctly completes the additional bullets. **OR** Correctly completes the first two bullets, but draws a rectangle with the crossed-out dimensions above for the third bullet and calculates the correct area.

2 points: The student has partial understanding of applying area and perimeter formulas for rectangles in real-world and mathematical problems. This is shown by completing the following: Two of the above. **OR** Draws and labels at least 2 rectangles correctly in the first and second bullets. **OR** Draws and labels at least 1 rectangle correctly in the first and second bullets, draws a rectangle that uses 24 feet of fencing and has an area greater than 60 square feet for the third bullet.

1 point: The student has limited understanding of applying area and perimeter formulas for rectangles in real-world and mathematical problems. This is shown by completing the following: One of the above. **OR** Draws and labels 1 rectangle correctly in the first and second bullets. **OR** Draws a rectangle that uses 24 feet of fencing and has an area greater than 60 square feet for the third bullet.

0 points: Shows little or no understanding of applying area and perimeter formulas for rectangles in real-world and mathematical problems.

NOTE: The maximum number of score points that can be earned for a response that does not include labels or includes incorrect labels is 3.

TE Information:

Item Code: MAT.04.CR.2.000MD.A.062

Template: Vertex-Based Quadrilaterals

Interaction Space Parameters:

- A. False (do not use default grid)
- B. Grid bottom-left is 0,0, top-right is 30,30; grid increment is one unit; do not display axes
- C. True (grid is visible)
- D. False (no graphic overlay)
- E. True (limit vertices to four)

Scoring Data:

- 1. True (consider this characteristic): rectangles
- 2. False (do not consider coordinates)
- 3. False (do not consider side lengths)
- 4. True (consider this characteristic); perimeter=24; tolerance=0
- 5. False (do not consider area)

TE Information:

Item Code: MAT.04.CR.2.000MD.A.062

Template: Drop Downs

Interaction Space Parameters:

- A. 12 menus
- B. All menus: [feet, square feet]; default = feet

Scoring Data:

Menu 1 = feet
Menu 2 = feet
Menu 3 = square feet
Menu 4 = feet
Menu 5 = feet
Menu 6 = square feet
Menu 7 = feet
Menu 8 = feet
Menu 9 = square feet
Menu 10 = feet
Menu 11 = feet
Menu 12 = square feet

Scoring Rule: NumErrors (0 Errors = 1)