Grade 3 – Geometry

Rectangle Dimensions

What are the possible dimensions (length and width) of a rectangle that has an area of 16 square centimeters?
1. 4 by 4
   \[4 \times 4 = 16\]

2. 8 by 2
   \[8 \times 2 = 16\]

3. 2 by 8
   \[2 \times 8 = 16\]

4. 16 by 1
   \[16 \times 1 = 16\]

5. 1 cm by 16
   \[1 \times 16 = 16\]
3 – Geometry

**Rectangle dimensions**
What are all the possible dimensions (length and width) of a rectangle that has an area of 16 square centimeters?

3 – 3 – 1

**CU** 5  The translation includes each of the key concepts of the task (rectangles, length, width, area) completely. Recording the proof that the square is composed of 16 unit squares (justifying the area) makes this translation thoroughly developed.

**PS** 5  The process of drawing each rectangle and then assuring the product of the dimensions is 16 is complete. The verification, which shows that the 5 different dimensions found are indeed the complete list makes this process thoroughly developed.

**V** 5  Listing each of the possible sets of dimensions with a product of 16, is a numeric review of each of the parts of the solution. Creating an organized list starting with a width of 1 and ending with a length of 1 makes the review thorough. Showing that the product of the dimensions is 16 for each figure and numbering the first rectangle to show the area also makes the verification more thorough.

**C** 4  The path connecting the translation of the task into a square, identifying the dimensions, finding the product and then showing the connection between the product and the area of the shape, then to the listing of the possible combinations of dimensions with a product of 16 is complete. The connecting path might have been made thorough with a clear statement as to what “answer” was found. It is always helpful when the verification is labeled.

**Acc** 5  Finding 5 possible dimensions for the rectangle is mathematically justified by the solution.
I think there are 3 ways

1. 2 rows, 8 columns

2. 

\[
\text{16 sq. cm.}
\]

3. 

Proof

I got my tiles.
I counted 16.
I put them in rectangles.
They match what I drew.
3 ways
3 – Geometry

**Rectangle dimensions**
What are all the possible dimensions (length and width) of a rectangle that has an area of 16 square centimeters?

3 – 3 – 2

**CU 3** The translation includes the key concept of area and the use of dimensions. There is no evidence the student understands that a square is a type of rectangle, or how to identify the dimensions of a rectangle, making the translation partially complete.

**PS 2** Beginning with 16 tiles and laying them out into rectangles and then recording the shapes is underdeveloped when s/he doesn’t see that since 1 is rotated to make 2 then 3 should be rotated to make another rectangle. This process is not organized to allow the student to know when s/he has all possibilities.

**V 1** Beginning with 16 tiles requires the area to be verified, but with no other review, this is only minimal.

**C 3** The path is connected between the translation of area into 16 tiles, the process of creating rectangles and then recording them, and the determination that there are 3 ways to make rectangles with area of 16. The connecting path might have been more than partially complete if s/he had said why s/he thought there were only 3 ways.

**Acc 1** There is not enough evidence to know there is not further instruction needed in rectangles (that a square is a rectangle), and in dimensions (s/he doesn’t record the dimensions of any of the rectangles). Requiring further instruction in a key concept moves accuracy to a score of 1.
I found 2.

\[ 8 \times 2 = 16 \]

\[ 4 \times 4 = 16 \]
3 – Geometry

**Rectangle dimensions**

What are all the possible dimensions (length and width) of a rectangle that has an area of 16 square centimeters?

3 – 3 – 2

**CU** 3  The translation includes the key concept of area and the use of dimensions. There is no evidence the student understands that a square is a type of rectangle, or how to identify the dimensions of a rectangle, making the translation partially complete.

**PS** 2  Beginning with 16 tiles and laying them out into rectangles and then recording the shapes is underdeveloped when s/he doesn’t see that since 1 is rotated to make 2 then 3 should be rotated to make another rectangle. This process is not organized to allow the student to know when s/he has all possibilities.

**V** 1  Beginning with 16 tiles requires the area to be verified, but with no other review, this is only minimal.

**C** 3  The path is connected between the translation of area into 16 tiles, the process of creating rectangles and then recording them, and the determination that there are 3 ways to make rectangles with area of 16. The connecting path might have been more than partially complete if s/he had said why s/he thought there were only 3 ways.

**Acc** 1  There is not enough evidence to know there is not further instruction needed in rectangles (that a square is a rectangle), and in dimensions (s/he doesn’t record the dimensions of any of the rectangles). Requiring further instruction in a key concept moves accuracy to a score of 1.