Root or Between?

Sort shaded tile counts by their square roots.

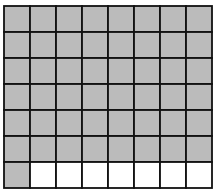
PA.N.1 "Read, write, compare, classify, and represent real numbers, and use them to solve problems in various contexts. Develop and apply the properties of integer exponents, including $a^0 = 1$ (with $a \neq 0$)..."

NAME _____ DATE _____

WHOLE-NUMBER ROOT

Count the shaded tiles. If the count is a perfect square, its square root is a whole number.

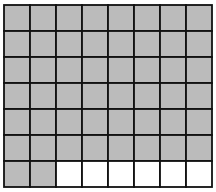
49 shaded tiles: $\sqrt{49} = 7$.



ROOT BETWEEN WHOLE NUMBERS

If the shaded count is not a perfect square, its square root lies between two consecutive whole numbers.

50 shaded tiles: $7 < \sqrt{50} < 8$.



1 SORT

8 items

For each figure, circle WHOLE or BETWEEN for the square root of its shaded tile count, then choose one figure from each category and explain how you knew.

1.

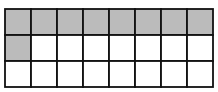


Figure 1

WHOLE BETWEEN

2.

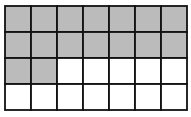


Figure 2

WHOLE BETWEEN

3.

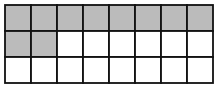


Figure 3

WHOLE **BETWEEN**

4.

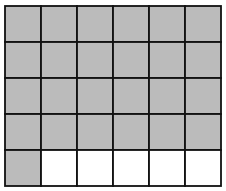


Figure 4

WHOLE **BETWEEN**

5.

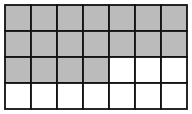


Figure 5

WHOLE **BETWEEN**

6.

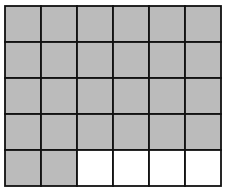


Figure 6

WHOLE **BETWEEN**

7.

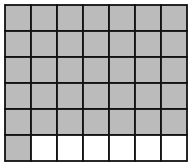


Figure 7

WHOLE **BETWEEN**

8.

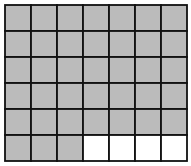


Figure 8

WHOLE **BETWEEN**

2 PROVE IT

Explain your thinking

Choose one figure from each category and explain how you knew.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Draw one new shaded array for WHOLE and one for BETWEEN, and label each shaded tile count without reusing a count on this page.

WHOLE

BETWEEN

CHALLENGE

Choose a BETWEEN figure, and use two perfect squares to show which consecutive whole numbers its square root falls between.

ANSWER KEY # Root or Between?

GRADE 8 · PA.N.1

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Figure 1 (array)	**WHOLE**	Nine shaded tiles; $\sqrt{9} = 3$.
2	Figure 2 (array)	**WHOLE**	Sixteen shaded tiles; $\sqrt{16} = 4$.
3	Figure 3 (array)	**BETWEEN**	Ten shaded tiles; $3 < \sqrt{10} < 4$.
4	Figure 4 (array)	**WHOLE**	Twenty-five shaded tiles; $\sqrt{25} = 5$.
5	Figure 5 (array)	**BETWEEN**	Eighteen shaded tiles; $4 < \sqrt{18} < 5$.
6	Figure 6 (array)	**BETWEEN**	Twenty-six shaded tiles; $5 < \sqrt{26} < 6$.
7	Figure 7 (array)	**WHOLE**	Thirty-six shaded tiles; $\sqrt{36} = 6$.
8	Figure 8 (array)	**BETWEEN**	Thirty-eight shaded tiles; $6 < \sqrt{38} < 7$.

PART 2 · PROVE IT

Task: Choose one figure from each category and explain how you knew.
Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **WHOLE**: A 4-by-5 array with 4 shaded tiles; $\sqrt{4} = 2$.
- **BETWEEN**: A 4-by-5 array with 5 shaded tiles; $2 < \sqrt{5} < 3$.

Challenge: Figure 5 has 18 shaded tiles. Since $16 < 18 < 25$, its square root is between 4 and 5.

WHOLE: 1, 2, 4, 7. BETWEEN: 3, 5, 6, 8. In Part 2, look for an explanation based on the shaded count, not the array's outline.