

Max's Mathematical Mosaic: The Quest for Square Numbers

Learning objective: To recognise and use square numbers and the notation for squared (2), and identify square numbers up to 12×12 .

Max the monkey is building a mosaic floor using square tiles. A square number is the result of multiplying an integer by itself. For example, $3 \times 3 = 9$, so 9 is a square number. Max has left some gaps in his pattern. Follow the instructions to complete the grid and solve the puzzles. For each question, show your calculation clearly.

Word bank: Product · Integer · Squared · Array · Area · Calculation · Dimension · Sequence

1. Max has a square rug with a side length of 7 units. Calculate the total number of tiles (the area) of the rug. Write this as a squared number calculation (e.g. $5^2 = 25$). (2 marks)

2. Identify which of the following numbers are square numbers: 16, 20, 36, 48, 81, 100. Justify your answer by showing the multiplication pair for each one you select. (4 marks)

3. Max claims that 144 is a square number. Prove if he is correct by explaining the relationship between the number 144 and its square root. (2 marks)

4. Compare and contrast the properties of square numbers and prime numbers. Why can a number rarely be both? (3 marks)

5. If a square garden has an area of 64 square metres, what is the length of one side? Explain how you calculated this. (2 marks)

6. What might happen to the area of a square if you doubled the length of its sides? Use the example of a 2x2 square becoming a 4x4 square to justify your answer. (3 marks)

Draw: Draw a visual representation of the square number 16. Use a grid to show how it forms a perfect square shape (a 4x4 array). Colour the edges of your square to highlight the side length.



Extension challenge: Max is planning a grand mosaic project. He has a budget of £120. If each tile costs £1, and he wants to create the largest possible square mosaic, what is the maximum area of the square he can build? List the side length and the total area, and explain why he cannot build a larger square.