Max’s Mathematical Market Stalls: A Study of Factors and Multiples

Learning objective: To identify, describe and represent factors and multiples, including finding all factor pairs of a number and identifying common factors of two numbers.

Read the scenario below and use your knowledge of number properties to help Max solve his market stall puzzles. Show your working out clearly.

Max the monkey has been busy organising his local craft market. He has 48 handmade wooden birdhouses to display on his stall. Max loves to arrange his items in perfect rectangular grids to make them look tidy. He knows that if he arranges them in rows of 6, he will have 8 rows, because 6 x 8 = 48. In this case, 6 and 8 are factor pairs of 48. Max also wants to offer 'Bundle Deals'. He sells bags of marbles in multiples of 4 (4, 8, 12, 16...). If a customer has £20, how many bags can they buy if each bag costs £4? By understanding factors and multiples, Max ensures every customer gets exactly what they need without any items left over.

Word bank: Factor · Multiple · Product · Prime number · Composite number · Factor pair · Common factor · Divisible

1. Max has 36 packets of wildflower seeds. List all the factor pairs of 36. How many different rectangular grid arrangements could Max create? (3 marks)

2. Explain why 12 is a common factor of both 24 and 36. Use your knowledge of division to justify your answer. (2 marks)

3. Max sells jars of honey for £5 each. Write down the first five multiples of 5. If a customer spends £35, how many jars have they purchased? (2 marks)

4. Compare and contrast the properties of the number 7 and the number 8. Why is 7 considered a prime number while 8 is a composite number? (3 marks)

5. Max has 24 blue ribbons and 30 red ribbons. He wants to make identical gift packs with the same number of blue and red ribbons in each, with none left over. What is the greatest number of gift packs he can make? (2 marks)

Draw: Draw two different rectangular arrays for the number 12. Label the factors used for the width and height of each array.

Extension challenge: What might happen to the number of possible factor pairs if Max increased his stock from 48 birdhouses to 60? Justify your reasoning by listing the factor pairs of 60 and comparing them to those of 48. Create a 'Factor Challenge' question for a friend to solve.