

Reasoning and Problem Solving

Step 3: Factor Pairs

National Curriculum Objectives:

Mathematics Year 4: (4C6a) [Recall multiplication and division facts for multiplication tables up to \$12 \times 12\$](#)

Mathematics Year 4: (4C6c) [Recognise and use factor pairs and commutativity in mental calculations](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Find the missing number from a given factor pair and clues. Includes known facts of the 3, 4, 6 and 8 times table.

Expected Find the missing number from a given factor pair and clues. Includes knowledge of known times table facts.

Greater Depth Find the missing number from a given factor and clues. Includes known times table facts. Includes times tables up to and beyond 12x, by using their knowledge of known multiplication facts.

Questions 2, 5 and 8 (Reasoning)

Developing Investigating how many number pairs selected numbers have and comparing them in terms of odd and even. Includes known facts of the 3, 4, 6 and 8 times table.

Expected Investigating whether all numbers have an even or odd number of factor pairs.

Greater Depth Investigating whether numbers in a specific times table will have an even number of factor pairs.

Questions 3, 6 and 9 (Reasoning)

Developing Investigating the concept that larger numbers have more factor pairs. Includes 3, 4, 6 and 8 times table.

Expected Investigating the concept that larger numbers have more factor pairs. Includes known times table facts, with given numbers to support.

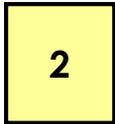
Greater Depth Comparing odd and even numbers in terms of number of factor pairs.

More [Year 4 Multiplication and Division](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

Factor Pairs

1a. Mrs Foster is ordering new pencils for her class. The total number of pencils has these two factors and is less than 30.



How many pencils might she have?

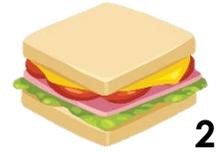
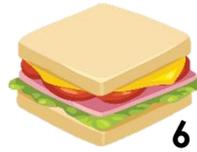
Find 2 possible answers.



PS

Factor Pairs

1b. Mr Parker has ordered sandwiches for a school trip. The total number of sandwiches has these two factors and is less than 30.



How many sandwiches might he have?

Find 2 possible answers.



PS

2a. Julia says,



14 has more factor pairs than 15 because it is an even number.

Is Julia correct? Prove it.



R

2b. William says,



21 has an odd number of factor pairs because it is an odd number.

Is William correct? Prove it.



R

3a. Is the statement below correct?

28 has more factor pairs than 24 because it is a bigger number.

Explain your answer.



R

3b. Is the statement below correct?

15 has fewer factor pairs than 17 because it is a smaller number.

Explain your answer.



R

Factor Pairs

4a. Lois is planting seeds in her garden in rows. The total number of seeds has these two factors and is less than 60.



How many seeds might she have?

Find 3 possible answers.



PS

Factor Pairs

4b. Marek is baking buns for a party. The total number of buns has these two factors and is less than 60.



How many buns might he have made?

Find 3 possible answers.



PS

5a. Razia says,



All numbers have an even number of factor pairs.

Is Razia correct? Prove it.



R

5b. David says,



An odd number will always have an odd number of factor pairs.

Is David correct? Prove it.



R

6a. Is the statement below correct?

56 has more factor pairs than 48 because it is a bigger number.

Explain your answer.



R

6b. Is the statement below correct?

44 has fewer factor pairs than 49 because it is a smaller number.

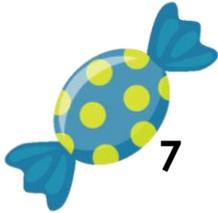
Explain your answer.



R

Factor Pairs

7a. Sofia is buying sweets to share with her friends. The total number of sweets has this factor, it is less than 100 but greater than 60.



How many sweets might she have?

Investigate how many possible answers you can find.



PS

Factor Pairs

7b. Mehmet is counting out buttons. The total number of buttons has this factor, it is less than 100 but greater than 60.



How many buttons might he have?

Investigate how many possible answers you can find.



PS

8a. Sienna says,



Numbers in the 4 times table will have an even number of factor pairs.

Is Sienna correct? Prove it.



R

8b. Elijah says,



Numbers in the 7 times table will have an odd number of factor pairs.

Is Elijah correct? Prove it.



R

9a. Is the statement below correct?

Odd numbers have more factor pairs than even numbers.

Explain your answer.



R

9b. Is the statement below correct?

Even numbers have more factor pairs than odd numbers.

Explain your answer.



R

Reasoning and Problem Solving Factor Pairs

Developing

- 1a. Various answers, for example: 4, 8, 12, 16, 20, 24, 28.
- 2a. Julia is incorrect. Both 14 and 15 have the same number of factor pairs. It has nothing to do with whether they are odd or even numbers.
- 3a. False. 28 has 3 factor pairs and 24 has four. Just because a number is larger, it does not mean it has more factor pairs.

Expected

- 4a. Various answers, for example: 12, 24, 36, 48.
- 5a. Razia is incorrect, some numbers have an odd number of factor pairs. For example, 12, 45 and 44 all have an odd number of factor pairs.
- 6a. False. Just because a number is larger, it does not mean it has more factor pairs. 56 has four factor pairs whereas 48 has five.

Greater Depth

- 7a. She could have 63, 70, 77, 84, 91 or 98.
- 8a. Sienna is incorrect. In the 4 times table, some numbers have an even number of factor pairs, such as; 8 and 24 and others have an odd number of factor pairs, such as 12 and 28.
- 9a. False. Just because a number is odd, it does not necessarily have more factors. Children should investigate this with a range of numbers as evidence.

Reasoning and Problem Solving Factor Pairs

Developing

- 1b. Various answers, for example: 6, 12, 18 24.
- 2b. William is incorrect. 21 has two factor pairs. The number of factor pairs is not dependent on whether the number is odd or even.
- 3b. False. The number of factor pairs is not linked to the size of the number. 15 has two factor pairs whereas 17 has one.

Expected

- 4b. Various answers, for example: 15, 30, 45.
- 5b. David is incorrect, some odd numbers have an even number of factor pairs. For example, 39, 49 and 57 all have two factor pairs.
- 6b. False. The number of factor pairs is not linked to the size of the number. 44 has three factor pairs whereas 49 has two.

Greater Depth

- 7b. He could have 64, 68, 72, 76, 80, 84, 88, 92 or 96.
- 8b. Elijah is incorrect. In the 7 times table, some numbers have an even number of factor pairs, such as; 14 and 21 and others have an odd number of factor pairs, such as 7 and 28.
- 9b. False. Just because a number is even, it does not necessarily have more factors. Children should investigate this with a range of numbers as evidence.