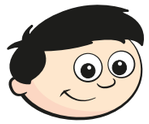
Make and test conjectures

1



To find the lowest common multiple of two numbers, you multiply them together.

a) Give an example to show when Dexter's statement is true.

e.g.

This is true when finding the LCM of [4] and [3]

b) Give an example to show when Dexter's statement is false.

e.g.

This is false when finding the LCM of [5] and [10]

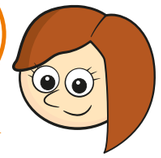
2 Decide whether the conjectures are always, sometimes or never true.

Conjecture	Always true	Sometimes true	Never true
An even number plus an even number always gives an even answer.	✓		
$a + b = b + a$	✓		
$a - b = b - a$		✓	
$2a = 5a$		✓	

Discuss your answers with a partner.

3

I think when you add the factors of a number (other than the number itself), the sum will always be less than the number.



Rosie's statement is sometimes correct.

a) Give an example of when Rosie's statement is correct.

4 : 1, 2, 4

1 + 2 < 4

b) Give an example of when Rosie's statement is not correct.

12 : 1, 2, 3, 4, 6, 12

1 + 2 + 3 + 4 + 6 > 12

4 Annie investigates the sum of two prime numbers.

- She finds that 5 + 7 = 12
- She also finds that 23 + 31 = 54

Annie conjectures that the sum of two prime numbers greater than 2 is always equal to a multiple of 2

Prove that Annie is correct.

All prime numbers greater than 2 are odd.

The sum of two odd numbers is always even.

5 Here are three number cards.

15	12	8

Find the three differences between each pair of numbers.

Work out the product of the differences.

15 – 12 = 3 15 – 8 = 7 12 – 8 = 4

Product of differences = 3 × 7 × 4 = 84

Repeat with three different integers.

e.g. 10, 7, 4 10 – 7 = 3 10 – 4 = 6 7 – 4 = 3

3 × 3 × 6 = 54

What do you notice about the product in each case? Is this always true?

It's always even.

6 Filip finds that the LCM of 5 and 6 is 30

He also finds that the LCM of 17 and 18 is 306

He notices that 5 × 6 = 30 and 17 × 18 = 306

Filip conjectures that the LCM of two consecutive numbers is equal to the product of the two numbers.

Investigate Filip's conjecture.

Two consecutive numbers will only ever share 1 as a common factor. This means they are coprime and hence the LCM will always be the product.

7 Choose a 2-digit number.

Use a calculator to divide by 99

Make a conjecture about the decimal equivalents of a fraction with a denominator of 99

Test some answers and then make a conjecture.

$\frac{13}{99} = 0.131313...$ $\frac{72}{99} = 0.727272...$

My conjecture is the answer will always be a recurring decimal where the digits that recur are the digits from the 2-digit number.

8 Take any 2-digit number and add it to the reverse of the 2-digit number.

For example, 54 + 45 = 99

Investigate with other examples. What do you notice?

31 + 13 = 44

Write a conjecture from your findings.

Adding a 2-digit number to it's reverse will always give a multiple of 11

Can you use counters or cubes to prove it?

Test your conjecture using 3-digit numbers.