

Grade 7 Maths Worksheet

Number sequence

Questions:

1. Busisiwe used the following steps to form her own number pattern:

- The first term is 2
- The second term is 5
- Each of the terms after the second term is the sum of the two terms before it.

So the first four terms in this sequence will then be: 2 ; 5 ; 7 ; 12

a) What will the next three terms in Busisiwe's sequence be?

b) Busisiwe decides to write her sequence as follows:

$$T_3 = T_2 + T_1 ; T_4 = T_3 + T_2 ; \dots \text{ where } T_3 \text{ stands for 'term 3'}$$

Use the same notation and write down how Busisiwe will represent the 20th term.

- c) If the 13th number in Busisiwe's sequence of numbers is 898 and the 11th number is 343, show how you can find the 12th number.
- d) Busisiwe's sequence takes on the same structure as an ancient number sequence that was formulated in 1202 and named after its founder. What was this sequence called?

2. Barbara bought a box of cookies and shared them with 3 of her friends.

- a) If each of her and her friends gets an equal amount of the total number of cookies in the box, what did Barbara do to share the cookies?
- b) If Barbara shared in the way you suggested in (a), and each person got 5 cookies, how many cookies were in the box?
- c) Barbara shared her cookies in the following way:
She gave the first friend one half of the cookies in the box, plus one cookie extra. Her second friend also got one half of what was left plus one extra cookie. The third friend came along and was treated in the same way as the other two friends. At the end of this, Barbara had 4 cookies left. How many cookies were there in the box to start with?
- d) If Barbara wanted 8 cookies left for herself, and shares with 3 friends as in (c), how many cookies should she buy?

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Solution

1.
 - a) $7 + 12 = 19$; $19 + 12 = 31$; $31 + 19 = 50$. So **19 ; 31 ; 50**
 - b) $T_{20} = T_{19} + T_{18}$ or write term 20 = term 19 + term 18
 - c) $T_{13} = T_{12} + T_{11} \rightarrow 898 = T_{12} + 343 \rightarrow T_{12} = 898 - 343 = 555$
 - d) The Fibonacci sequence
2.
 - a) Barbara divided the box of cookies into 4 equal parts.
 - b) total cookies = 5×4
= 20
 - c) Cookies in the box = $\left[(((4+1)2+1)2+1)2\right] = \left[(((11)2+1)2)\right] = \left[(23)2\right] = 46$.
 - d) $\left[(((8+1)2+1)2+1)2\right] = \left[(((19)2+1)2)\right] = \left[(39)2\right] = 78$.

Being able to form a sequence of numbers by following given instructions is an important skill.

Learners must learn how to construct algebraic expressions based on structural exploration. It allows them to work from input to output, and also from output back to input.

Appendix of Assignment Tools

This sequence takes on the same structure as the Fibonacci sequence

Algebraic thinking skills

Manipulation of a rule to get to an answer

Symbolic notation is required

Whole and part of the whole relationship

Constructing number sentences

Structural exploration

Input / Output