RICH MATHEMATICAL TASK BOOKLET

ALGEBRA

YEAR 5/6
ODD YEARS

Copy Masters

Task 1

Parvati is making mala for a Diwali decoration. She is threading the flowers in a pattern: red, green, yellow, orange, blue, purple.

What will be the colour of the 76^{th} flower that she threads?

Find two different ways of solving the task and representations to prove your solutions.

Task 1 (independent)

At Te Oro the Siva Samoa group is learning a maulu'ulu. As part of the dance, they used these movements:

arm, arm, arm, arm, clap, tap, tap, tap

They repeat these moves lots of times throughout the dance.

If they repeat the moves two times, how many taps would there be? How many arms would there be? How many claps would there be?

Complete the table below:

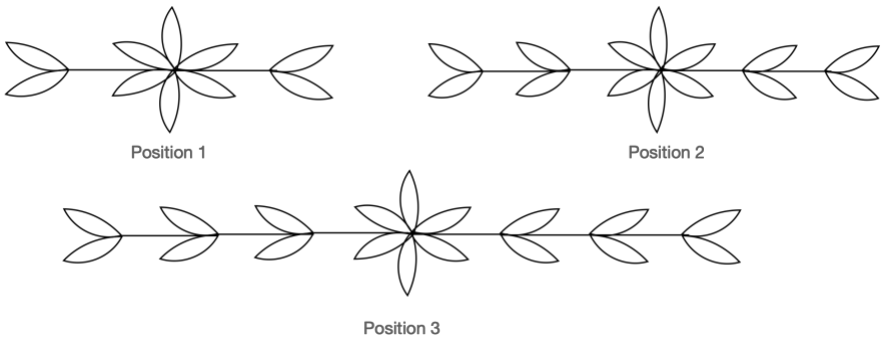
Number of movement sequence	Tap	Arm	Clap
1			
			2
3			
	12		
		20	
6			
7			
			8

How many of each movement would there be if there were 50 movement sequences?

How many of each movement would there be if there were 101 movement sequences?

What rules could you use to find the number of specific movements for any number of movement sequences?

Task 2



This is the first three positions of a pattern on ngatu.

Viliami want to use the same pattern for a large ngatu and keep the pattern the same.

How do you see the pattern growing? Represent the pattern using numbers.

How many leaves would the next position have?

How many leaves would the 6^{th} position have?

How many leaves would the 11^{th} position have?

Represent this using a diagram and numbers

Task 2 (independent)

Parvati is making mala for a Diwali decoration. She is threading the flowers in a pattern: orange, green, red, blue, yellow.

What will be the colour of the 43rd flower that she threads?

Find two different ways of solving the task and representations to prove your solutions.

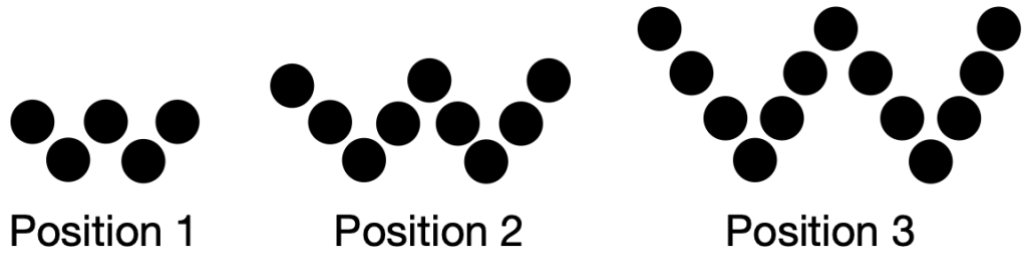
What do you notice about all of the yellow flowers in relation to their pattern position?

What rule could you use to find the location of every yellow flower?

What rule could you use to find the location of every red flower?

Task 3

Tatiana is making a pattern with counters:



Use the counters to make the pattern for pattern 4.

How many counters would be used for pattern 8?

How many counters would be used for pattern 12?

What do you notice?

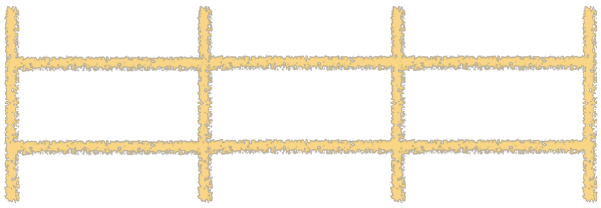
Represent using counters the parts of the pattern that are staying the same and the part of the pattern that changes as it grows using different colours.

How many counters would be used for pattern 34?

What rule could be used to find the number of counters for any pattern number?

Task 3 (independent)

Mele is helping her Mum build a fence around their house.



This is the third section of the fence.

Build and then draw what the first, second, and fourth section would look like.

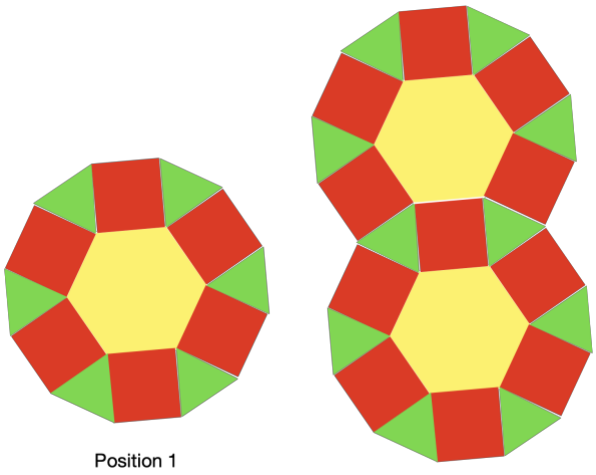
Complete the table:

Fence section	Number of posts
1	
2	
3	
4	
5	
8	
10	
13	
21	
25	

What patterns do you notice?

Can you develop a rule for the number of posts for the fence section of any size?

Task 4



Use the shape cards to build Position 4 and 5.

Complete the table:

Position Number	Hexagons	Squares	Triangle	Total pieces
1				
2				
3				
4				
5				
6				
7				
8				

Identify three patterns across the table and three patterns down the table.

How many hexagons would there be for the 10th sequence?

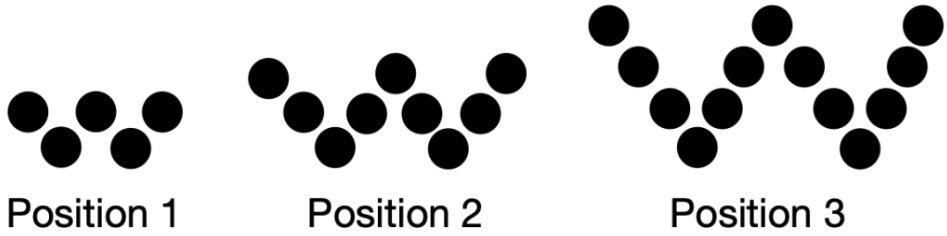
How many squares would there be for the 10th sequence?

How many triangles would there be for the 10^{th} sequence?

How many shapes in total would there be for the 10^{th} sequence?

Task 4 (independent)

Tatiana is making a pattern with counters:



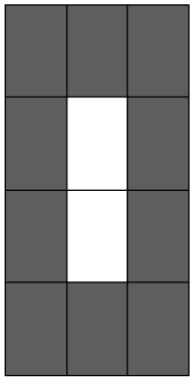
Complete the table:

Pattern number	**Number of counters**
1	
2	
3	
4	
5	
8	
10	
11	
16	
21	

A pattern has 73 counters in it, what pattern number has Tatiana made?

Task 5

A community centre is replacing the flooring in the corridor as the tiles are worn out. They are using a pattern of grey and white tiles as below:



How many grey tiles would be needed for a corridor with 10 white tiles?

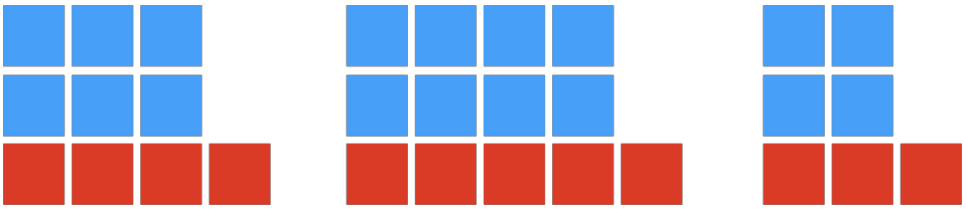
How many grey tiles would be needed for a corridor with 14 white tiles?

How many grey tiles would be needed for a corridor with 50 white tiles?

How many grey tiles would be needed for a corridor with 100 white tiles?

Describe the relationship between the white tiles and the grey tiles.

Task 5 (independent)



Sima is playing with tiles. He builds the patterns above.

Use the tiles to build other patterns that would belong in the sequence.

What would be the first pattern in the sequence?

What is the relationship between the red tiles and the blue tiles in the pattern?

Use a table of data and a graph to show how the number of blue tiles relates to the number of red tiles.

Task 6

NZ Bargain phone plans is currently offering two deals for mobile data.

Plan A costs $20 monthly membership plus $8 per 1 gb.

Plan B costs $45 monthly membership plus $4 per 1 gb

Use a number sentence to represent the two deals.

Show the results for Plan A and Plan B in a table.

Amount of GB	Plan A	Plan B
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Which deal is better?

What advice would you give to someone considering both the plans?

Task 6 (independent)

Develop a growing pattern to match these rules:

Squares = $(4 \times n) + 3$

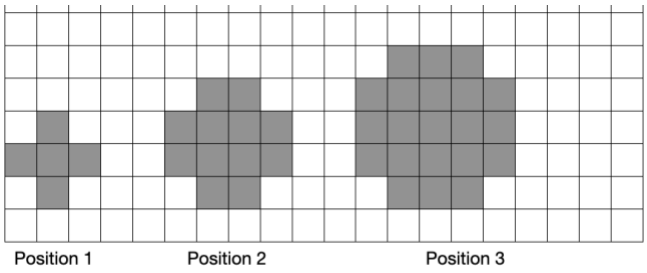
Ice-block sticks = $(8 \times h) + 4$

Tiles = $(5 \times g) - 1$

Develop your own growing patterns and write a rule to match them.

Task 7

Payton builds a pattern with the blocks:



Use the square shapes to create Position 4, Position 5, and Position 6 and draw these.

How many squares would they each use?

How many squares would be used for position 10?

How many squares would be used for position 20?

How could you find out how many squares would needed for any position number?

Task 7 (independent)

Ta’ase and Lina are selling different types of chocolate bars to fundraise for camp.

Ta’ase gets $4 for each chocolate bar.

Lina has saved $25. Additionally, for each chocolate bar she sells, she gets $2.

Write a number sentence to represent each situation.

Use a table of data and graph to show when Ta’ase and Lina will have the same amount of money and how many chocolate bars Ta’ase will need to sell to have more money.

Task 8

The Fibonacci Sequence reflects growth that we can see in nature.

Each term is calculated by adding the previous two terms together.

1, 1, 2, 3, 5, 8, 13, 21

Continue the Fibonacci sequence and find the following terms.

The Fibonacci sequence also has other patterns in it.

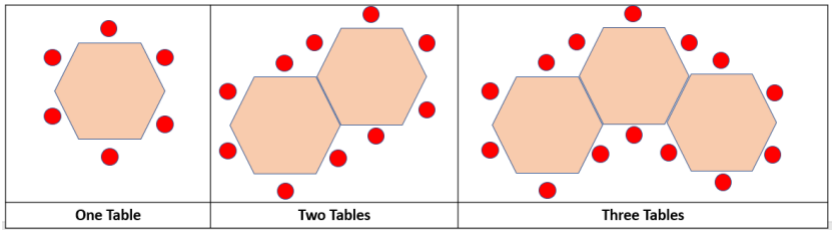
Adding any three consecutive Fibonacci numbers together.
Record the results in a table.
What do you notice?
Can you explain it?

Adding any four consecutive Fibonacci numbers together.
Record the results in a table.
What do you notice?
Can you explain it?

Task 8 (independent)

Eva and Hone have been put in charge of organising tables and seats for their school graduation night dinner.

They've worked out that 198 people are coming.



How many people can be seated at 5 tables, 11 tables, 22 tables?

Represent how the pattern grows using a table of data or graph.

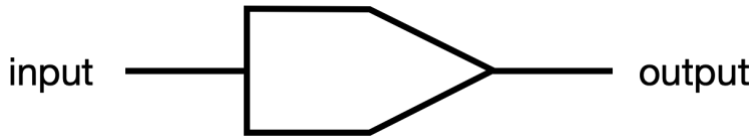
How many tables do Eva and Hone need to organise for 198 people?

Can you find the relationship between the number of tables and chairs in words or symbols and justify how the rule works with your representation.

Task 9

Function machines are clever machines which transform numbers.

What are the rules for the function machines with the following results:

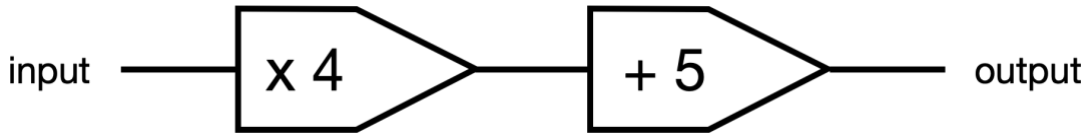


Machine B

In	Out
8	4
9	5
16	12
14	10
20	16
7	3
18	14

Other function machines have more than one input

Work out the results for Machine C using the following rules:

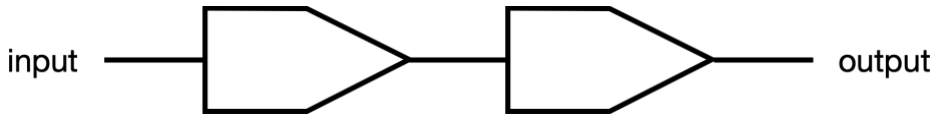


Machine C

In	Out
4	
8	
1	
20	
0	
100	

Task 9 (continued)

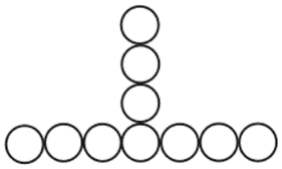
What is the rule for Machine D?



Machine D

In	Out
10	28
6	16
8	22
11	31
2	4
5	13
19	52
12	34

Task 9 (independent)



This is Pattern 3.

Draw what you think Pattern 2 and Pattern 1 would look like.

How many different patterns can you see in this drawing?

Show all the patterns that you can see.

Continue the pattern for Pattern 4 – 10.

Use a table of data to represent the pattern and explain the patterns that you have found.

Task 10

How many squares are in position one?

How many squares are in position two?

How many squares are in position three?

What do you notice about the pattern and how it grows?

Draw and describe Pattern 4 and Pattern 5.

How many squares do they each have?

How many squares would there be for position 10?

How many squares would there be for position 12?