

Modelling Patterns

GOAL

Use models to represent, extend, and make predictions about number patterns.

You will need toothpicks and pennies.

1. Rebecca made a pattern using toothpicks and pennies. Then she started a number table.



- a) Fill in the shaded cells of Rebecca's number table.

Number of triangles	1	2	3				
Number of toothpicks	3	5					
Number of pennies	3						

At-Home Help

A pattern rule is a description of how a pattern starts and how it continues.

For the pattern 2, 6, 10, 14, ..., the pattern rule is "Start at 2 and add 4 each time."

- b) Use toothpicks and pennies to extend Rebecca's pattern up to four triangles. Sketch your model.
- c) What is the pattern rule for the number of toothpicks?

What is the pattern rule for the number of pennies?

- d) Predict the number of pennies needed for five triangles.
- _____ pennies

Make a model to check. Sketch your model.

- e) Extend the pattern for up to seven triangles. Then complete the number table above.

GOAL

Describe and extend increasing number patterns.

1. What is a pattern rule for each pattern?

a) 1, 3, 5, 7, ...

Pattern rule: _____

b) 5, 10, 15, ...

Pattern rule: _____

c) 12, 22, 32, ...

Pattern rule: _____

2. Fill in the next three numbers in each pattern.

a) 2, 3, 4, _____, _____, _____

b) 20, 25, 30, _____, _____, _____

c) 3, 6, 9, _____, _____, _____

3. Kate made a table to show the ingredients for chocolate macaroons.

a) Extend Kate's pattern for up to five batches. Fill in the table.

Number of batches	Butter (mL)	Chocolate squares	Coconut (mL)
1	100	5	250
2	200	10	500

b) Write each pattern rule.

Pattern rule for butter: _____

Pattern rule for chocolate squares: _____

Pattern rule for coconut: _____

At-Home Help

In an increasing number pattern, each number is greater than the number before.

- 10, 11, 12, ... is an increasing number pattern. The pattern rule is "Start at 10 and add 1 each time."
- 50, 100, 150, 200, ... is an increasing number pattern. The pattern rule is "Start at 50 and add 50 each time."

Extending Decreasing Patterns

GOAL

Describe and extend decreasing number patterns.

1. What is a pattern rule for each pattern?

a) 10, 8, 6, ...

Pattern rule: _____

b) 15, 14, 13, ...

Pattern rule: _____

c) 90, 85, 80, ...

Pattern rule: _____

2. Fill in the next three numbers in each pattern.

a) 77, 76, 75, _____, _____, _____

b) 1000, 900, 800, _____, _____, _____

c) 24, 20, 16, _____, _____, _____

3. Owen is packing his collection of 150 comic books into boxes. 10 comics fit in each box. Owen created a pattern to show the number of boxes he needs. His pattern is 150, 140, 130,

a) Why do the numbers in Owen's pattern decrease by 10 each time?

b) What is Owen's pattern rule? _____

c) How many boxes does Owen need? _____ boxes

4. Jay bought 47 jelly beans. Starting the next day, he ate 5 jelly beans every day. How many days did it take for Jay to eat all the jelly beans?

At-Home Help

In a decreasing number pattern, each number is less than the number before.

- 50, 40, 30, ... is a decreasing number pattern. The pattern rule is "Start at 50 and subtract 10 each time."
- 20, 18, 16, 14, ... is a decreasing number pattern. The pattern rule is "Start at 20 and subtract 2 each time."

Describing Number Patterns in Games

GOAL

Create a number pattern game and describe the patterns.

1. Shanti, Kate, and Mateo are playing a number pattern game on a 100 chart. Shanti moves 2 spaces each turn. Kate moves 5 spaces each turn. Mateo moves 3 spaces each turn. The person who passes 100 first wins the game.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- a) Shanti starts at 10. What number is she on after 3 turns? _____
- b) Kate starts at 2. What number is she on after 3 turns? _____
- c) Mateo starts at 4. What number is he on after 3 turns? _____
- d) Write a pattern rule for each player.

Shanti's pattern rule: _____

Kate's pattern rule: _____

Mateo's pattern rule: _____

- e) Predict who will win the game. Explain your thinking.

- f) Model the game. Who wins? _____
