



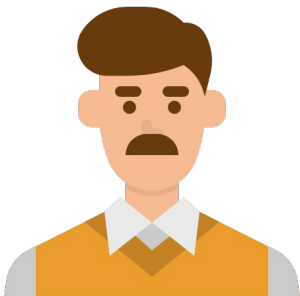
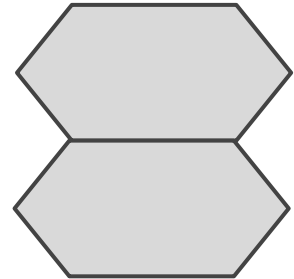
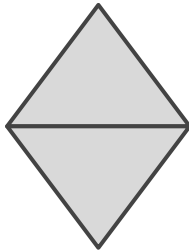
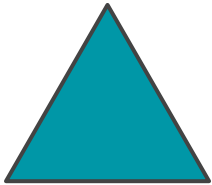
# Helping With Math

## Understanding Number and Shape Patterns

**GRADE 4**



Pattern is a vital element of mathematics. It deals with repetition of shapes and numbers on a specific trend or behavior. Understanding patterns help us to see relationship, form conclusions, and provide predictions.



**What image should be the next one?  
Why do you say so? What  
relationship did you see among the  
shapes?**



Number and Shape Patterns



## GENERATING PATTERNS


Common number patterns can be generated by:

- adding a fixed number
- subtracting a fixed number
- multiplying a fixed number
- dividing a fixed number
- combination of basic operations
- In general, by any governed rule.



Let's now generate a number pattern!

*Rule: Start with 1. Add 2 after every number.*

1	3	5	7	9	11	13
						

The generated number pattern using the rule is:  
1, 3, 5, 7, 9, 11, and 13.

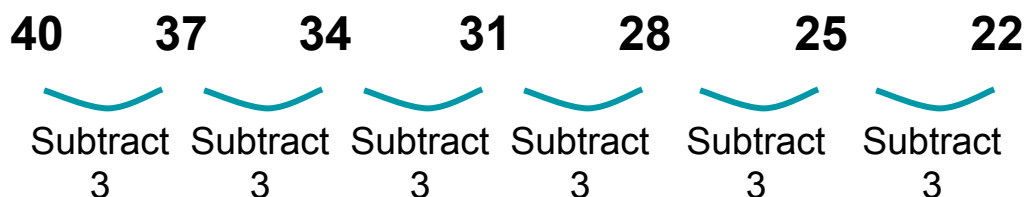


Is the number pattern somehow familiar to you? What kind of numbers are these? Correct! They are odd numbers!



## GENERATING PATTERNS

*Rule: Start with 40. Subtract 3 after every number.*



The generated number pattern using the rule is:  
40, 37, 34, 31, 28, 25, and 22.



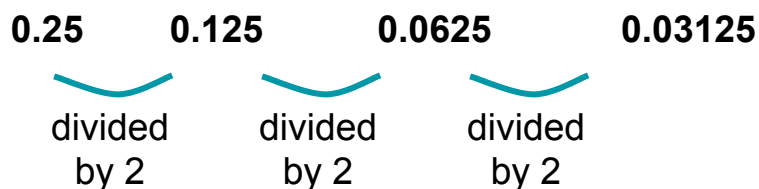
*Rule: Start with  $\frac{1}{2}$ . Multiply 2 after every number.*



The generated number pattern using the rule is:  
 $\frac{1}{2}$ , 1, 2, 4, 8, 16, and 32.



*Rule: Start with 0.25. Divide 2 after every number.*

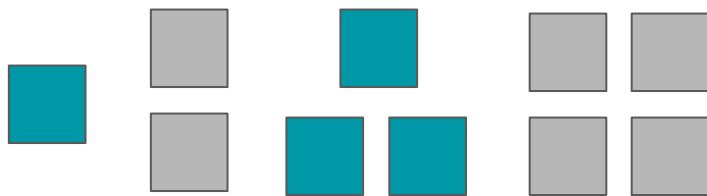


## SHAPE PATTERNS

The generated number pattern using the rule is:  
0.25, 0.125, 0.0625, and 0.03125

### Shape Patterns

Shape patterns happen when a cluster of shapes are repeated over and over again. These patterns follow a certain sequence, or order, of shapes that is then repeated at least two times.



**How many squares should there be on the fifth image?**

\_\_\_\_\_



**What shape should be inside the circle of the fourth image?**

\_\_\_\_\_

Draw the next three figures here.



## TABLE OF ACTIVITIES

1. A Cloudy Day
2. Beautiful Sunrise
3. Beat the Summer Heat
4. Gloomy Weather
5. Roaring Thunder
6. Hurricane Damage
7. Cold, Cold, Cold Night
8. Escape the Avalanche
9. Rainbow After the Rain
10. Today is a Sunny Day



## A CLOUDY DAY

A cloudy day at the park is a perfect time to answer this activity! Examine the following set of numbers. Write a rule that they follow on the space provided.



1. 38, 40, 42, 44, 46, 48, 50, ...

Rule: \_\_\_\_\_

2. 5, 10, 15, 20, 25, 30, ...

Rule: \_\_\_\_\_



3. 14, 28, 42, 56, 70, 84, ...

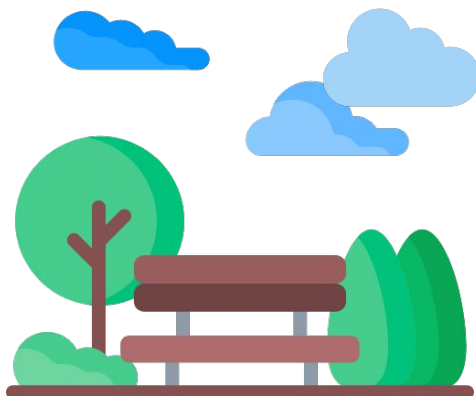
Rule: \_\_\_\_\_

4. 15, 30, 45, 60, 75, 90, ...

Rule: \_\_\_\_\_

5. 11, 22, 33, 44, 55, 66, ...

Rule: \_\_\_\_\_



# BEAUTIFUL SUNRISE

A beautiful sunrise means a great day to learn! Examine how subtraction was used to create these number patterns.



1. 100, 90, 80, 70, 60, ...

Rule: \_\_\_\_\_

2. 89, 73, 57, 41, 25 ...

Rule: \_\_\_\_\_

3. 95, 90, 85, 80, 75, ...

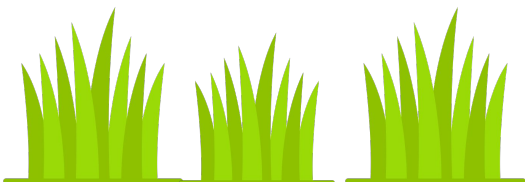
Rule: \_\_\_\_\_

4. 21, 19, 17, 15, 13...

Rule: \_\_\_\_\_

5. 569, 444, 319, 194 ...

Rule: \_\_\_\_\_



# BEAT THE SUMMER HEAT

Grab these pearl coolers to beat the summer heat. All you need to do is write the rule that involves multiplication on these set of numbers.



1. 5, 25, 125, 625,...

Rule:

---

---



2. 3, 6, 12, 24, 48,...

Rule:

---

---



3. 11, 121, 1331,...

Rule:

---

---



4. 21, 42, 84, 168, ...

Rule:

---

---

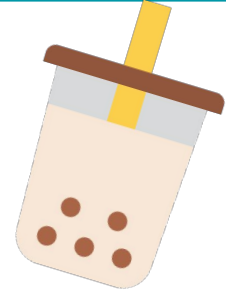


5. 2, 10, 50, 250,...

Rule:

---

---



6. 1, 7, 49, 343,...

Rule:

---

---



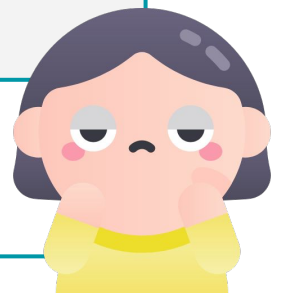


# GLOOMY WEATHER

Don't let this gloomy weather stop you from learning about number patterns! What do you think is the rule of these numbers?



Numbers	Rule
1. 100, 50, 25, ...	
2. 1000, 100, 10, 1, ...	
3. 1024, 256, 64, 16, ...	
4. 4096, 512, 64, ...	
5. 80, 40, 20, ...	



# ROARING THUNDER

Put a stop on these roaring thunders by completing these number patterns. Note: Create a 5-number pattern.



**Rule:** Start with 500 and create a number pattern by subtracting 23 to each term.

A large dashed rectangular box for writing the number pattern for the first rule.

**Rule:** Multiply each number by 3 then add 1. Start with 4.

A large dashed rectangular box for writing the number pattern for the second rule.

**Rule:** Divide each number by 3. Start with 729.

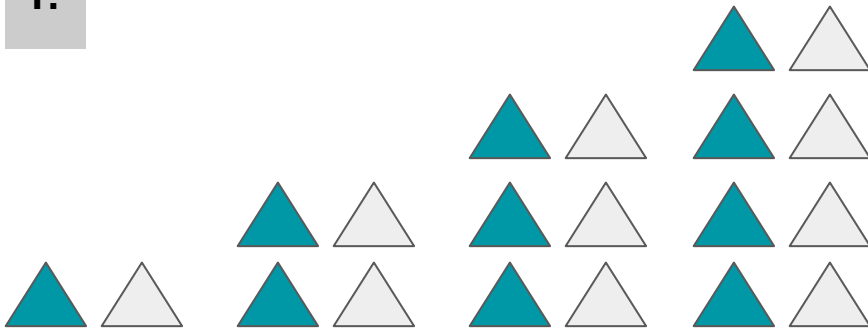
A large dashed rectangular box for writing the number pattern for the third rule.



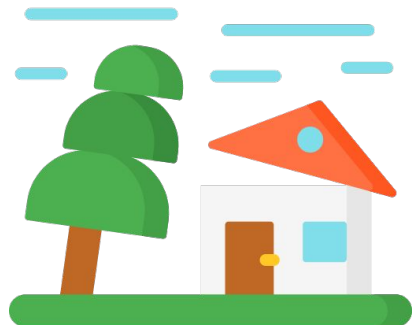
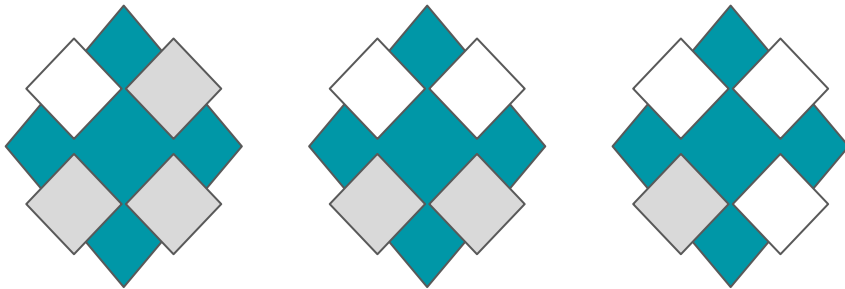
# HURRICANE DAMAGE

Avoid these events when a hurricane is coming in your town by illustrating the next image of the shape patterns.

1.

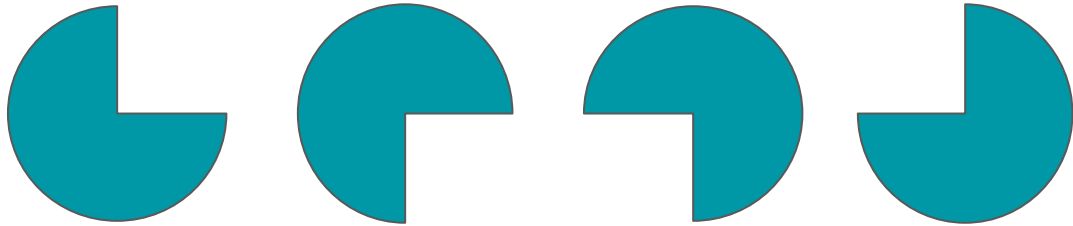


2.

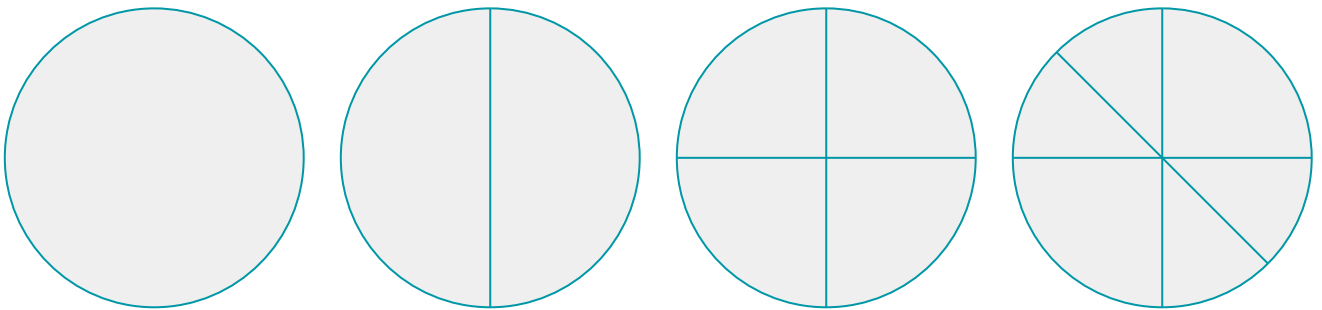


# COLD, COLD, COLD NIGHT

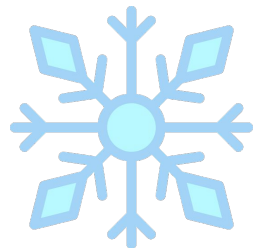
Cold night is approaching. Keep yourself away from any cough and colds by completing the tasks below.



Describe how the shape patterns behave.



If the pattern continuous, how does the fifth image will look like?

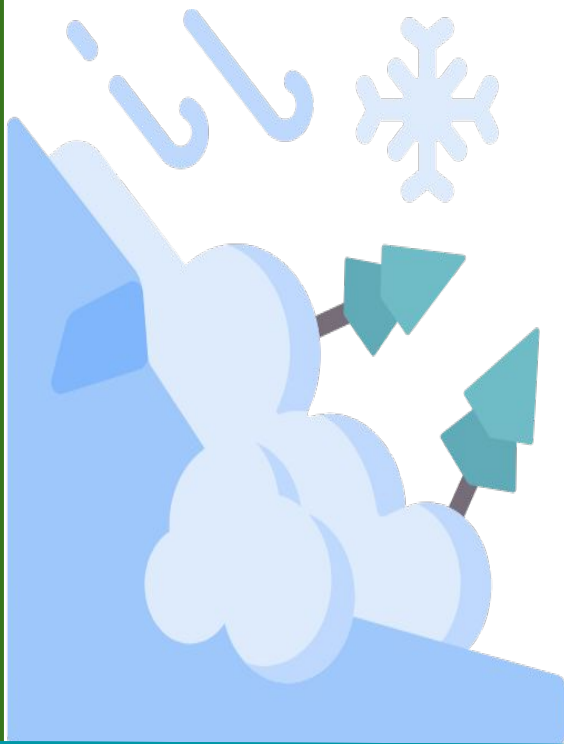


# ESCAPE THE AVALANCHE

Escape the avalanche by creating shape patterns using these rules.

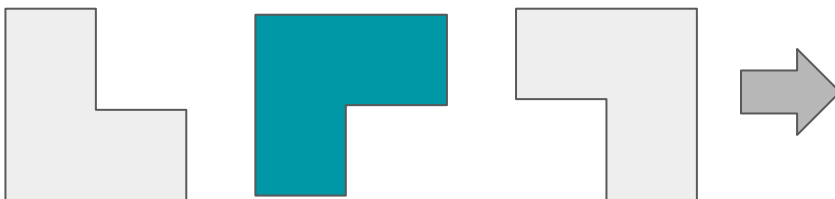
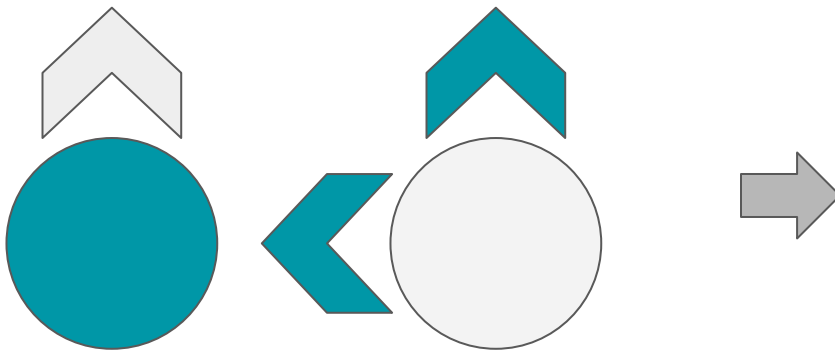
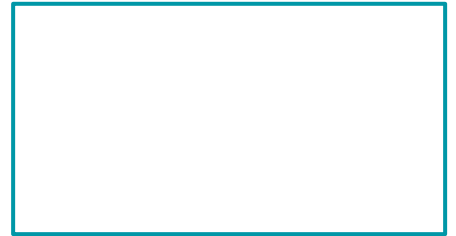
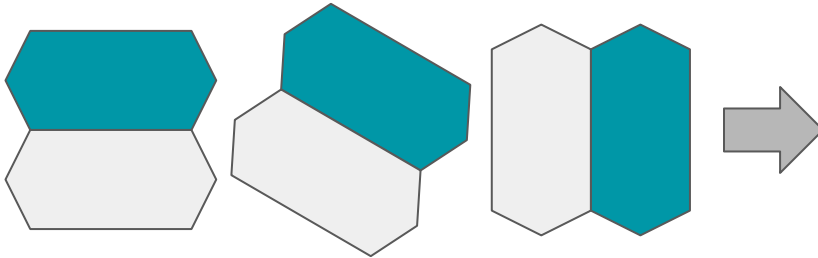
Create a shape pattern that starts with circle and the succeeding shapes have increasing number of sides until 6 sides.

Create a shape pattern where a diamond in a trapezoid rotates in clockwise manner. (Draw 4 images).



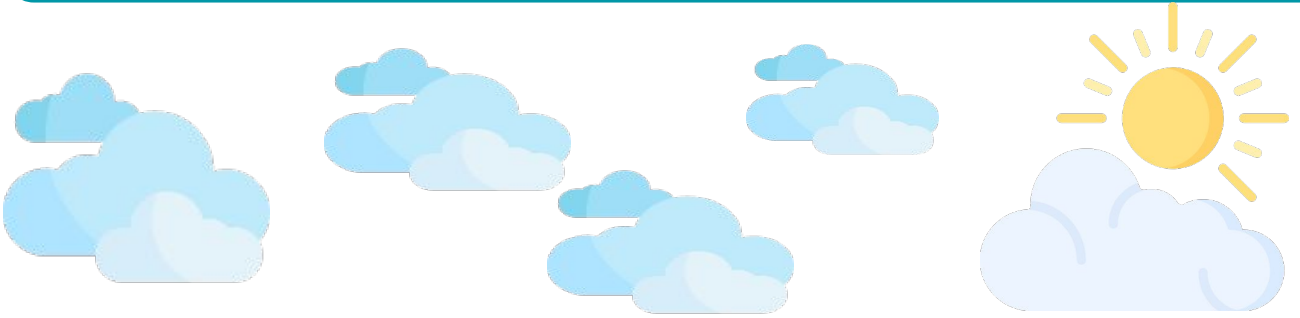
# RAINBOW AFTER THE RAIN

Unleash the beauty of a rainbow by guessing what image should come next. Draw your answer.



# TODAY IS A SUNNY DAY

Today is a sunny day. An amazing day to do some reflections. Read and understand each question below then write your answer on the space provided.



1. What makes number pattern similar to weather/climate in general?

---

---

---

2. What are the benefits of making intellectual predictions? If we can guess what shape/number will come next, how would we benefit from it?

---

---

---



# ANSWER GUIDE

## Activity 1

1. Add 2      2. Add 5      3. Add 14      4. Add 15      5. Add 11

## Activity 2

1. Subtract 10      2. Subtract 16      3. Subtract 5  
4. Subtract 2      5. Subtract 125

## Activity 3

1. Multiply 5      2. Multiply 2      3. Multiply 11  
4. Multiply 2      5. Multiply 5      6. Multiply 7

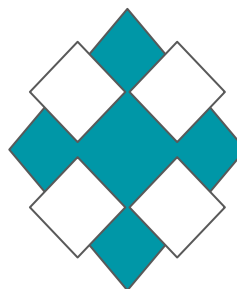
## Activity 4

1. Divide 2      2. Divide 10      3. Divide 4  
4. Divide 8      5. Divide 2

## Activity 5

1. 500, 477, 454, 431, 408,  
3. 729, 243, 81, 27, 9, 3      2. 4, 13, 40, 121, 364, 1092

## Activity 6





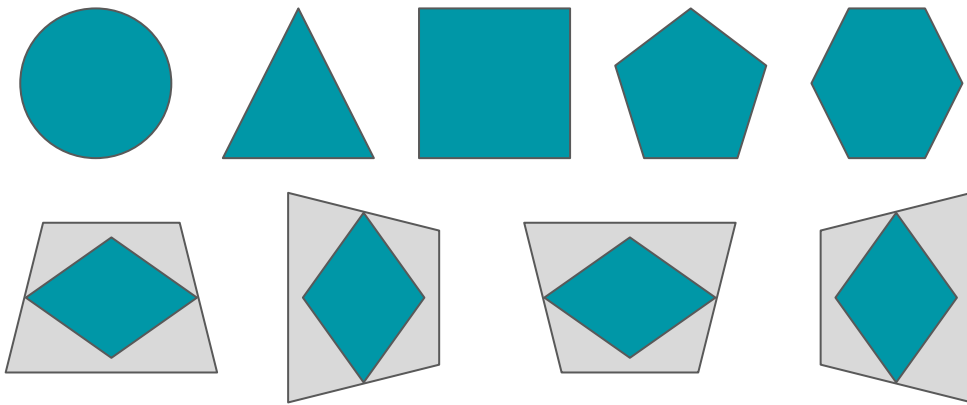
# ANSWER GUIDE

## Activity 7

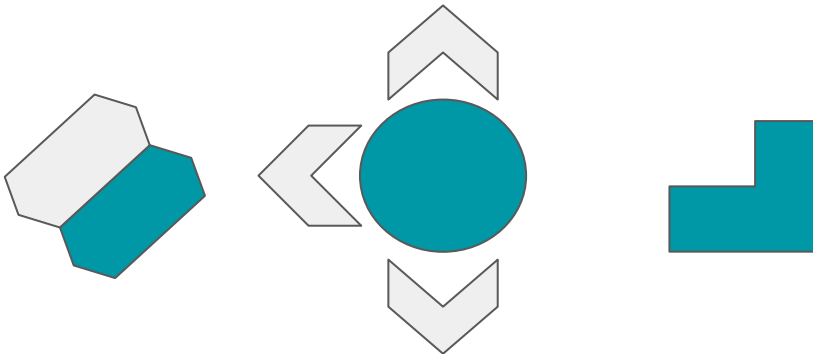
Possible answer:

1. The shape is rotating clockwise. Seems like the cut part is changing its position.
2. The fifth image will have four lines that cut the circle.

## Activity 8



## Activity 9



## Activity 10

Answers may vary.



# Copyright Notice

This resource is licensed under the [Creative Commons Attribution-NonCommercial 4.0](https://creativecommons.org/licenses/by-nc/4.0/) International license.

You are free to:

- **Share** — copy and redistribute the material in any medium or format
- **Adapt** — remix, transform, and build upon the material

Under the following terms:

- **Attribution** — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- **NonCommercial** — You may not use the material for commercial purposes.

For more information on this license, visit the following link:

<http://creativecommons.org/licenses/by-nc/4.0/>

Where possible, free-use images are sourced from online repositories such as Wikipedia and Wikimedia Commons. References and sources for images are provided in the speaker notes section of this document.

Thank you!



# Thank you

Thank you so much for purchasing and downloading this resource.

We hope it has been useful for you in the classroom and that your students enjoy the activities.

For more teaching and homeschooling resources like this, don't forget to [come back](#) and download the new material we add every week!

Thanks for supporting **Helping With Math**. We can provide teachers with low-cost, high-quality teaching and homeschooling resources because of our loyal subscribers and hope to serve you for many years to come.

- The Entire Helping With Math Team :)

