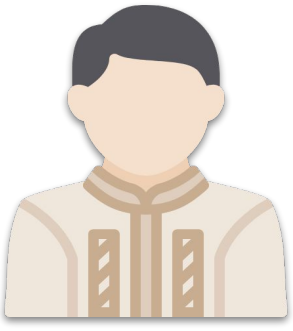
Helping With Math

Identifying Arithmetic Patterns of Numbers

GRADE 3

Can you identify the arithmetic pattern used in 1, 3, 5, 7, 9? Arithmetic pattern is one of the simplest sequences that we can learn. In this worksheet, you will learn to identify the arithmetic patterns of numbers.



Hi! I am Carl. I'll be your tour guide for today. Let me tour you around the Pearl of the Orient Sea - the Philippines!

In creating a thread of numbers that is related to one another, the addition or subtraction from a common difference is needed.

HUNDREDS CHART

Common difference is the constant difference in all pairs of consecutive numbers in a sequence.

HOW TO IDENTIFY ARITHMETIC PATTERNS OF NUMBERS?

2 , 4 , 6 , 8 , 10

+2 +2 +2 +2

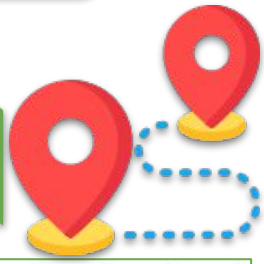
Common difference is constant ✓

3 , 4 , 6 , 7 , 10

+1 +2 +1 +3

Common difference is not constant ✗

HUNDREDS CHART



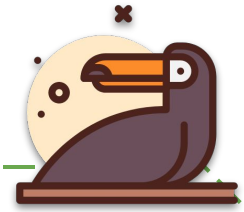
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Hundred chart is used to determine the next number of the arithmetic sequence by referring to the chart horizontally, vertically and diagonally.

For example,
What should be the next number in the sequence
2, 12, 22 ?

By looking at the chart, you will determine the the common difference of the numbers is 10. And by observing vertically, you will see that the next value is 32.

MULTIPLICATION CHART



We can also determine arithmetic patterns of numbers using multiplication chart.

For example,
The sequence 4, 8, 12, 16 is an arithmetic pattern that increases by 4. We can easily identify the next numbers using the chart.

Multiplication Chart

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120

REMEMBER:

- Even numbers are always divisible by 2.
- Even numbers can be decomposed into two equal numbers such that

  $$18 = 9 + 9$$

- Multiples of even numbers are always even numbers
- On multiplication chart, the products in each row and column increase by the same amount (skip counting).

ADDITION CHART

Addition Chart

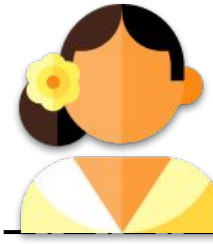
+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

- ***Addition chart*** is used to identify arithmetic patterns of numbers by predicting the sum.
- To use the addition chart, you need to consider the following principles below:

1.) When you add two even numbers together, the resulting sum is **always even**.
For example: 4 + 8 = 12
Therefore, even + even = even

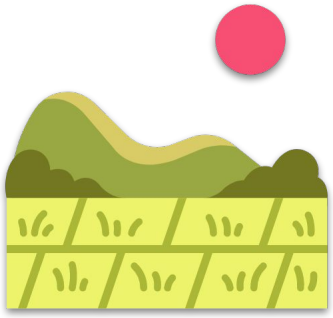
2.) When you add two odd numbers together, the resulting sum is **always even**.
For example: 3 + 5 = 7
Therefore, odd + odd = odd

3.) When you add an odd number and an even number together, the resulting sum is **always odd**.
For example: 7 + 2 = 9
Therefore, odd + even = odd



ARITHMETIC NUMBERS

The ***rule*** indicates how much should we add, subtract, multiply or divide to the previous number in the sequence to determine the next term or number. Let's study the examples below.



Arithmetic Numbers	Rule	Proof
2 , 3 , 4 , 5 , 6 , 7	add 1	2+1 , 3+1 , 4+1 , 5+1 , 6+1
11 , 9 , 7 , 5 , 3 , 1	subtract 2	11-2 , 9-2 , 7-2 , 5-2 , 3-2
5 , 10 , 20 , 40 , 80	multiply 2	5x2 , 10x2 , 20x2 , 40x2
400, 200, 100, 50, 25	divide 2	$\frac{400}{2}, \frac{200}{2}, \frac{100}{2}, \frac{50}{2}$

- In the first example, notice that the rule stated is to add 1. To determine the next term, we add 1 to the previous number. The same goes with the second example.

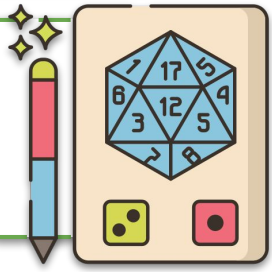
- In the third example, the first term is just multiplied by 2 to determine the next term. Also, in the fourth example, the first term is just divided by 2 to determine the 2nd term.

LET'S PRACTICE

Identify the arithmetic pattern in the following problems.

1. Find the next term in the arithmetic pattern below,

7, 15, 23, 31, ___



2. Find the next term in the arithmetic pattern below,

31, 24, 17, 10, ___

3. Find the next term in the arithmetic pattern below,

3, 6, 9, 12, ___

4. Find the next term in the arithmetic pattern below,

40, 20, 10, ___

5. Find the next term in the arithmetic pattern below,

2, 5, 8, ___

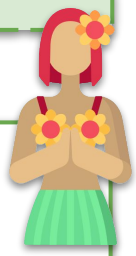
TABLE OF ACTIVITIES

WHITE BEACH BORACAY

White Beach Boracay people need our help to clean their beach resorts. Help them clean the resorts by answering the given problems below. Encircle the correct letter from the choices given.

1. In the pattern 1, 2, 3, 4…. The common difference is:

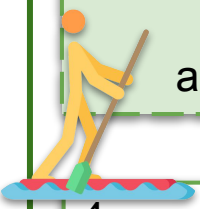
a. -2 b. 1 c. 5



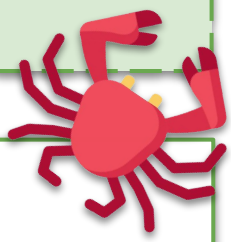
2. What is the next number in this pattern: 10, 12, 14, 16, __.

a. 24 b.18 c. 30

3. We use _____ to go from one term to another.



a. Arithmetic b. Common difference c. Pattern

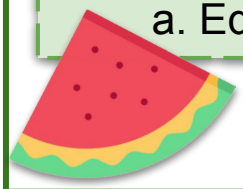


4. _____ is a list of numbers with definite pattern.

a. Arithmetic Sequence b.Common difference c.Common Pattern

5. If the common difference between consecutive terms is _____, we can say that the sequence is increasing.

a. Equal b. Positive c. Decreasing



CHOCOLATE HILLS BOHOL

The picturesque chocolate hills is one of the tourist spots in Bohol Philippines. To capture its majestic view, identify whether the statement is True (T) or False (F). Check the circle of the correct answer.

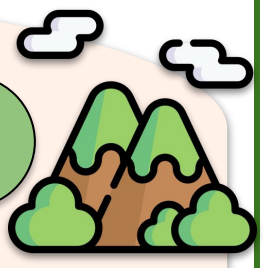
1. Common ratio is being used in determining arithmetic pattern. (T) (F)

2. Arithmetic pattern could be ascending or descending. (T) (F)

3. When the common difference is negative we say that the pattern is decreasing. (T) (F)

4. To identify the next pattern number, add the same amount to the previous number. (T) (F)

5. The pattern 1,2,3,4,5 is an arithmetic pattern. (T) (F)

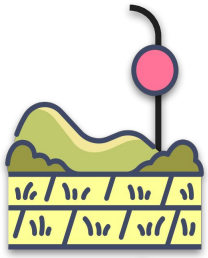


BANAUE RICE TERRACES

Ifugao people needs your help to promote their product in your country, you can help by solving the problems below. Analyze the arithmetic pattern then fill the blanks with the correct answer.

1. **64 , 32 , 16 , ___ , ___ , ___**

2. **1 , 3 , 9 , ___ , 81 , ___ , ___**



3. **7 , 14 , 28 , ___ , ___**

4. **3 , 6 , ___ , ___ , 48 , ___ , 192**

5. **500 , ___ , 125 , ___ , 125/4 , ___**

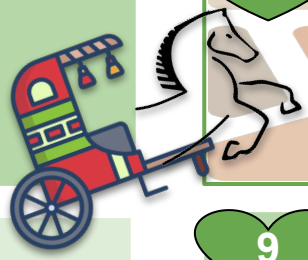
CALLE CRISOLOGO VIGAN

Do you want to see the famous cobblestone streets in Vigan? You can visit Vigan by answering the problems below. Determine whether the number thread is an arithmetic pattern or not. Write your answer on the space provided.

1. 2 , 11 , 20 , 29 _____

2. 324 , 108 , 36 , 12 , 4 _____

3. 1 , 10 , 3 , 12 , 5 _____



4. 67 , 70 , 64 , 68 , 61 _____

5. 14 , 17 , 13 , 15 , 12 _____

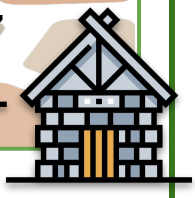
6. 17 , 21 , 13 , 23 , 9 _____

7. 90 , 10 , 85 , 15 , 80 _____

8. 2 , 4 , 6 , 8 , 10 _____

9. 3 , 9 , 15 , 21 , 27 _____

10. 1 , 10 , 19 , 28 , 37 _____



MOUNT AMPACAO SAGADA

To reach the peak of Mt. Ampacao, you need to answer the following problems. Determine the rule of the arithmetic pattern. Write your answer on the space provided.

Arithmetic Pattern	Rule
1.) 12 , 15 , 18 , 21 , 24	_____
2.) 20 , 30 , 40 , 50 , 60	_____
3.) 11 , 22 , 33 , 44 , 55	_____
4.) 45 , 40 , 35 , 30 , 25	_____
5.) 6 , 8 , 10 , 12 ,14	_____
6.) 15 , 19 , 23 , 27 , 31	_____

BARRACUDA LAKE

Barracuda Lake is about 40 meters deep and surrounded by sharp limestone cliffs. To dive in, you need to solve the following problems. Determine the next term of the sequence below. Shade the circle of your answer.

1.) 15 , 30 , 45 , ___

- 30
- 60
- 50

2.) 4 , 6 , 8 , ___

- 10
- 12
- 16

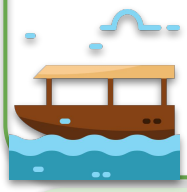
3.) 3 , 6 , 9 , ___

- 12
- 15
- 20

4.) 30 , 60 , 90 , ___

- 20
- 15
- 120

5.) 25 , 50 , 75 , ___



- 125
- 100
- 115

6.) 4 , 8 , 12 , ___

- 16
- 12
- 20

7.) 15 , 20 , 25 , ___

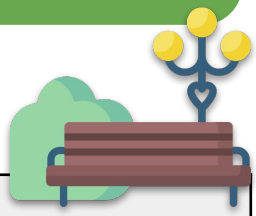
- 30
- 60
- 50

8.) 80 , 60 , 40 , ___

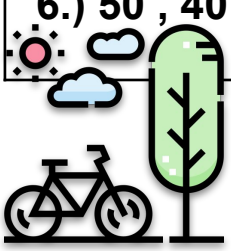
- 20
- 80
- 50

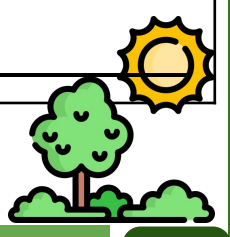
BAGUIO CITY

Do you want to have a look at the famous Mines View Park in Baguio City? You can tour around Mines view park if you manage to determine the next value in the arithmetic pattern given. Also, identify the rule and justify your answer on the space provided.



PATTERN	RULE	PROOF
1.) 24 , 34 , 44 , ___	_____	_____
2.) 17 , 14 , 11 , ___	_____	_____
3.) 8 , 10 , 12 , ___	_____	_____
4.) 28 , 35 , 42 , ___	_____	_____
5.) 100 , 80 , 60 , ___	_____	_____
6.) 50 , 40 , 30 , ___	_____	_____

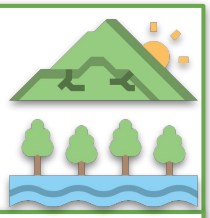




UNDERGROUND RIVER

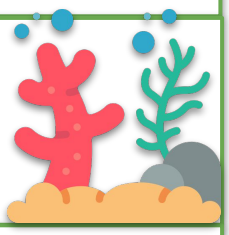
Do you want to see the famous underground river? You can enter the cave if you manage to answer the following problems. Given the rule of addition or subtraction, fill up the blanks with values according to the rule.

1. Subtract 5 — **112 , ___ , ___ , ___ , ___**



2. Add 2 — **4 , 6 , ___ , ___ , ___**

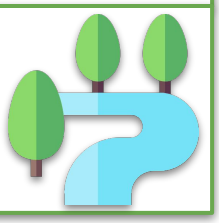
3. Add 6 — **3 , ___ , ___ , ___ , ___**



4. Subtract 1 — **5 , ___ , ___ , ___ , ___**

5. Subtract 2 — **100 , 98 , ___ , ___ , ___**

6. Add 4 — **6 , 10 , ___ , ___ , ___**



HAGIMIT FALLS

Hagimit Falls has several pools with running water linking them at different levels. For you to be able to go on the next pool, you need to answer the following word problems below. Show your solution on the space provided.

1 Justin plans to save money for his upcoming vacation trip. He plans to save $50 on the first week with a constant increase of $20 every week. How much should he save on the third week?

2 Mae's family is having a roadtrip. They plan to stop every 11km. At what kilometer would be their 3rd stop from their starting point?

3 Kim and his friends are having their mountain climbing activity. They plan to rest every 30-minute climbing. If they started at 6:00 am, what time would be their second rest time?

SIARGAO ISLAND

To experience extreme activities in the beautiful land of Siargao, you need to read and analyze the word problems below. Answer the problems correctly and show your solution on the space provided.

1.) Annabelle is baking cookies by batch for their snacks going to Ilocos Norte.

If Annabelle keeps on following the pattern, how many cookies will be on the 5th batch?

2.) Identify the common difference from the above problem.

3.) Mikee is in-charge in counting the number of students for their retreat next week. The class is divided into 5 groups:

If Mikee keeps on following the pattern above, how many students are there in the 5th group?

4.) Identify the common difference from the above problem.

ANSWER GUIDE

Activity 1

1. b 2. b 3. b 4. a 5. b

Activity 2

1. F 2. T 3. T 4. T 5. T

Activity 3

1. 64/2 , 32/2 , 16/2 , 8/2 , 4/2 : **8 , 4 , 2**
2. 1x3 , 3x3 , 9x3 , 27x3 , 81x3 , 243x3 : 1, 3, 9, **27 ,** 81**, 243 , 729**
3. 7x2 , 14x2 , 28x2 , 56x2 : 7, 14, 28, **56 , 112**
4. 3x2 , 6x2 , 12x2 , 24x2 , 48x2 , 96x2 : 3, 6, **12 , 24 ,** 48**, 96, 192**
5. 500/2 , 250/2 , 125/2 , (125/2)/2 , (125/4)/2 : **250 , 125/2 , 125/8**

Activity 4

1. Arithmetic
2. Arithmetic
3. Not Arithmetic
4. Not Arithmetic
5. Not Arithmetic
6. Not Arithmetic
7. Not Arithmetic
8. Arithmetic
9. Arithmetic
10. Arithmetic

Activity 5

1. 12+3 , 15+3 , 18+3 , 21+3 : **add 3**
2. 20+10 , 30+10 , 40+10 , 50+10 : **add 10**
3. 11+11 , 22+11 , 33+11 , 44+11 : **add 11**
4. 45-5 , 40-5 , 35-5 , 30-5 : **subtract 5**
5. 6+2 , 8+2 , 10+2 , 12+2 : **add 2**
6. 15+4 , 19+4 , 23+4 , 27+4 : **add 4**

ANSWER GUIDE

Activity 6

1. 15+15 , 30+15 , 45+15 : **60**
2. 4+2 , 6+2 , 8+2 : **10**
3. 3+3 , 6+3 , 9+3 : **12**
4. 30+30 , 60+30 , 90+30 :**120**
5. 25+25 , 50+25 , 75+25 : **100**
6. 4+4 , 8+4 , 12+4 : **16**
7. 15+5 , 20+5 , 25+5 : **30**
8. 80-20 , 60-20 , 40-20 : **20**

Activity 7

1. **54 , add 10**: 24+10 , 34+10 , 44+10
2. **8 , subtract 3**: 17-3 , 14-3 , 11-3
3. **14 , add 2**: 8+2 , 10+2 , 12+2
4. **49 , add 7**: 28+7 , 35+7 , 42+7
5. **40 , subtract 20**: 100-20 , 80-20 , 60-20
6. **20 , subtract 10**: 50-10 , 40-10 , 30-10

Activity 8

1. 112-5, 107-5, 102-5, 97-5: **107,102,97,92**
2. 4+2 , 6+2 , 8+2 , 10+2 : **8,10,12**
3. 3+6 , 9+6 , 15+6 , 21+6 : **9,15,21,27**
4. 5-1 , 4-1 , 3-1 , 2-1 : **4,3,2,1**
5. 100-2 , 98-2 , 96-2 , 94-2 : **96,94,92**
6. 6+4 , 10+4 , 14+4 , 18+4 : **14,18,22**

Activity 9

1. 50+20 , 70+20 , 90+20 ; 70, 90, **110 ;** He needs to save **$110**
2. 0+11km, 11km+11km, 22km+11km ; 11, 22, **33**: At **33 km**
3. 6:30 AM, 7:00 AM ; **7:00 AM** is their second rest time.

Activity 10

1. 1+2 , 3+2 , 5+2 , 7+2 : **9 cookies**
2. **Common difference = +2**
3. 10+2 , 12+2 , 14+2 , 16+2 : **18 students**
4. **Common difference = +2**

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