

Day 8 - Extending Patterns

- Draw the change from step to step
- Extend or go backwards

Example

1	2	3	4	5
4	7	10	13	x

Example: Tom has invested \$100, each week he puts in \$40. How many weeks until there is \$300 in the account?

Part 2: writing an equation

- Try the answers until one works

Which is the equation for the following table:

x	1	2	3	4	5
y	2	5	8	11	14

$$Y = 2x + 4$$

$$y = 3x + 4$$

$$Y = -2x + 1$$

$$y = 3x - 1$$

OGT Preparation #8

Name _____

AL05 - Number Patterns, Finding the Nth Term (table to graph) & AL06 – Write an equation

1. The table below contains the results of a biology experiment.

Record of Blooms

Week	1	2	3	4	5
Number of Blooms	3	9	27	81	b

Assuming the pattern shown in the table continues, what is the value of b ?

- A. 108 B. 130 C. 162 D. 243

2. The first four rows of a number array are shown below.

Row 1				10
Row 2			20	30
Row 3		40	50	60
Row 4	70	80	90	100

What number will be at the far right end of row 7?

- A. 150 B. 210 C. 280 D. 360

3. Maria is making a quilt. She has a large piece of fabric that is 0.02 millimeters thick. The fabric is cut in half and one piece is placed on top of the other to make a pile. The pile is cut in half, and then one half is placed on top of the other to make a higher pile. Continuing this process, what would the thickness of the pile be after the 4th cut and piling?

- A. 0.0016 millimeters B. 0.08 millimeters
C. 0.32 millimeters D. 16 millimeters

4. The depth of a lake is measured at the same location and on the same day every year for a number of years. The table below shows the measurements.

Depth of Lake

Year	Depth (in feet)
1998	60
1999	55
2000	48
2001	39

5. If the pattern continued, what was the depth of the lake in 2002?

- A. 30 feet B. 29 feet C. 28 feet D. 25 feet

Nancy decided to breed gerbils to sell to a pet store. She started with 2 gerbils and determined that they should quadruple in number every 4 months. Nancy sold all of the gerbils to the pet store at the end of 1 year. How many gerbils did Nancy sell to the pet store?

- A. 24 gerbils B. 66 gerbils C. 128 gerbils D. 512 gerbils

6. The owner of a sporting goods store is following a pattern to arrange baseballs into 7 rows for a wall display. The table shows the number of baseballs in the first four rows of this pattern.

Row	Number of Baseballs
1	25
2	24
3	22
4	19
5	...
6	...
7	?

How many baseballs are in the seventh row of this pattern?

- A. 17 B. 15 C. 10 D. 4

15. The first five rows of a number array are shown below.

Row 1					1
Row 2				2	3
Row 3			4	5	6
Row 4		7	8	9	10
Row 5	11	12	13	14	15

What is the sum of the numbers in row 8?

- A. 175
B. 224
C. 231
D. 260

PART 2

8. Under ideal conditions, there is an inverse relationship between the pressure (P) and the volume (V) of a gas. The table shows the relationship of the experimental pressures recorded for four different volumes of the gas.

Pressure and Volume of Experimental Gas (Boyle's Law)

Volume (liters)	Pressure (kilopascals)
1.9	50.2
2.8	34.9
8.7	11.5
6.6	15.0

Which equation shows the relationship between the pressure and the volume of this gas?

A. $V = \frac{P}{25}$

B. $V = \frac{25}{P}$

C. $\frac{100}{P}$

D. $V = P - 48$

9. The table below shows values for x and y .

x	y
0	-1
1	0
2	3
3	8
4	15
5	24

Which of these equations represents the relationship between x and y ?

A. $y = x - 1$

B. $y = x + 19$

C. $y = x^2 - 1$

D. $y = 2x^2 - 5$

10. The first 5 terms of a sequence are given in the table.

Term Number (n)	Term Value (t)
1	2
2	5
3	10
4	17
5	26

For this sequence, which of these represents the relationship between n , the number of the term, and t , its corresponding value?

A. $t = n^2 + 1$

B. $t = 2n + 1$

C. $t = 3n - 1$

D. $t = 2n^2 - 1$

11. A construction company buys \$38,400 worth of new equipment, the value of which decreases linearly so that its value after 8 years is \$2,200. By what amount is the value of the equipment decreasing per year?

A. \$ 275

B. \$4,525

C. \$4,800

D. \$5,075

12. SA. (2 points) The maximum heart rate is the highest number of beats per minute recommended for a person while exercising. The rate is dependent upon the age of the person as shown below. The relationship is linear.

Age	Maximum Heart Rate
10	210
15	205
20	
25	
30	
35	
40	
45	
50	

In your **Answer Document**, copy and complete the table.

Write an equation that can be used to find the maximum heart rate for any age. Show your work or provide an explanation for how you determined your equation.

13. Mr. Richards needs to price items that must be sold within 90 days, and he has two options. In Option A, Mr. Richards prices items at \$225 and gives \$1.00 off the price for every day that the item does not sell.

For Option B, he prices items at \$250 and gives \$2.00 off for every day the item does not sell.

In your **Answer Document**, write an equation for each option that relates the price of the item to the number of days that the item has not sold.

Use the equations to find the day on which the two options yield the same price.

14. Michael paid \$6.00 for a ticket to a football game. Soft drinks at the game cost \$0.75. Michael bought x drinks at the game. Which equation represents the total amount (y) he spent?

A. $y = (6 + 0.75)x$

B. $y = 6x + 0.75$

C. $y = 6 - 0.75x$

D. $y = 6 + 0.75x$

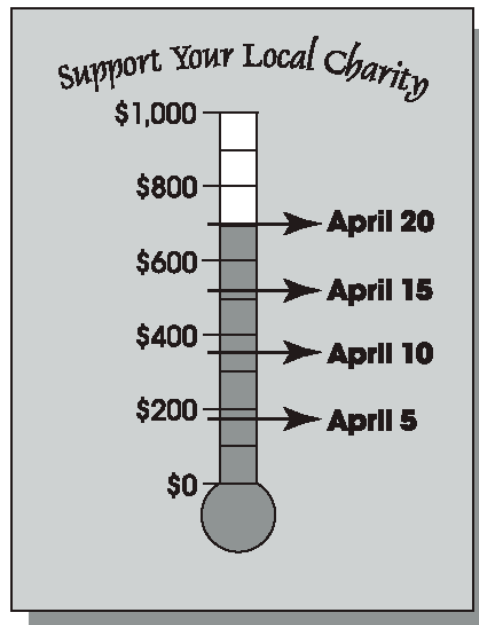
15. The table shows values for a function.

x	y
1	4
2	9
3	16
4	25

Which equation represents this function?

- A. $y = x^2$
 - B. $y = x^2 + 1$
 - C. $y = (x - 1)^2$
 - D. $y = (x + 1)^2$
16. [SA] Last spring, the employees of an Akron tire company contributed to a local charity. The graphic represents the total dollar contributions as of several dates in April.

In your **Answer Document**, determine on what date the charity could have expected to reach its goal of \$1,000, if the pattern of donations remains about the same. Show your work or provide an explanation for your answer.



1. The table below contains the results of a biology experiment.

Record of Blooms

Week	1	2	3	4	5
Number of Blooms	3	9	27	81	b

(Handwritten: $\times 3$ between 3 and 9, and $\times 3$ between 9 and 27)

Assuming the pattern shown in the table continues, what is the value of b?

- A. 108 B. 130 C. 162 **D. 243**

2. The first four rows of a number array are shown below.

Row 1				10
Row 2			20	30
Row 3		40	50	60
Row 4	70	80	90	100

5	9	11	12	13	14	15
6		16	17	18	19	20
7	22	23	24	25	26	27
8	29	30	31	32	33	34

What number will be at the far right end of row 7?

- A. 150 B. 210 **C. 280** D. 360

3. Maria is making a quilt. She has a large piece of fabric that is 0.02 millimeters thick. The fabric is cut in half and one piece is placed on top of the other to make a pile. The pile is cut in half, and then one half is placed on top of the other to make a higher pile. Continuing this process, what would the thickness of the pile be after the 4th cut and piling?

- A. 0.0016 millimeters B. 0.08 millimeters
C. 0.32 millimeters D. 16 millimeters

fold	thickness
0	.02
1	.04
2	.08
3	.16
4	.32

4. The depth of a lake is measured at the same location and on the same day every year for a number of years. The table below shows the measurements.

Depth of Lake

Year	Depth (in feet)
1998	60
1999	55
2000	48
2001	39

(Handwritten: -5 , -7 , -9 , -11 next to rows 1999-2001; $2, 8$ below 2001)

5. If the pattern continued, what was the depth of the lake in 2002?

- A. 30 feet B. 29 feet **C. 28 feet** D. 25 feet

6. Nancy decided to breed gerbils to sell to a pet store. She started with 2 gerbils and determined that they should quadruple in number every 4 months. Nancy sold all of the gerbils to the pet store at the end of 1 year. How many gerbils did Nancy sell to the pet store?

- A. 24 gerbils B. 66 gerbils **C. 128 gerbils** D. 512 gerbils

Month	ger.
0	2
4	8
8	32
12	128

6. The owner of a sporting goods store is following a pattern to arrange baseballs into 7 rows for a wall display. The table shows the number of baseballs in the first four rows of this pattern.

Row	Number of Baseballs
1	25
2	24
3	22
4	19
5	15 ...
6	10 ...
7	4?

$\left. \begin{array}{l} \text{Row 1} \\ \text{Row 2} \end{array} \right\} -1$
 $\left. \begin{array}{l} \text{Row 2} \\ \text{Row 3} \end{array} \right\} -2$
 $\left. \begin{array}{l} \text{Row 3} \\ \text{Row 4} \end{array} \right\} -3$
 $\left. \begin{array}{l} \text{Row 4} \\ \text{Row 5} \end{array} \right\} -4$
 $\left. \begin{array}{l} \text{Row 5} \\ \text{Row 6} \end{array} \right\} -5$
 $\left. \begin{array}{l} \text{Row 6} \\ \text{Row 7} \end{array} \right\} -6$

How many baseballs are in the seventh row of this pattern?

- A. 17 B. 15 C. 10 D. 4

15. The first five rows of a number array are shown below.

Row 1				1	
Row 2			2	3	
Row 3		4	5	6	
Row 4	7	8	9	10	
Row 5	11	12	13	14	15

What is the sum of the numbers in row 8?

- A. 175
 B. 224
 C. 231
D. 260

6			16	17	18	19	20	21
7		22	23	24	25	26	27	28
8	29	30	31	32	33	34	35	36

PART 2

8. Under ideal conditions, there is an inverse relationship between the pressure (P) and the volume (V) of a gas. The table shows the relationship of the experimental pressures recorded for four different volumes of the gas.

Pressure and Volume of Experimental Gas (Boyle's Law)

Volume (liters)	Pressure (kilopascals)
1.9	50.2
2.8	34.9
8.7	11.5
6.6	15.0

Which equation shows the relationship between the pressure and the volume of this gas? *try 15 look for 6.6*

A. $V = \frac{P}{25}$
no

B. $V = \frac{25}{P}$
no

C. $\frac{100}{P}$
yes

D. $V = P - 48$
no

9. The table below shows values for x and y .

x	y
0	-1
1	0
2	3
3	8
4	15
5	24

try 3 look for 8

Which of these equations represents the relationship between x and y ?

A. $y = x - 1$
no

B. $y = x + 19$
no

C. $y = x^2 - 1$
yes

D. $y = 2x^2 - 5$
no

10. The first 5 terms of a sequence are given in the table.

Term Number (n)	Term Value (t)
1	2
2	5
3	10
4	17
5	26

try 4 look for 17

For this sequence, which of these represents the relationship between n , the number of the term, and t , its corresponding value?

A. $t = n^2 + 1$
yes

B. $t = 2n + 1$
no

C. $t = 3n - 1$
no

D. $t = 2n^2 - 1$
no

11. A construction company buys \$38,400 worth of new equipment, the value of which decreases linearly so that its value after 8 years is \$2,200. By what amount is the value of the equipment decreasing per year?

A. \$ 275

B. \$4,525

C. \$4,800

D. \$5,075

*subtract 8 times
see if you get
2200*

12. SA. (2 points) The maximum heart rate is the highest number of beats per minute recommended for a person while exercising. The rate is dependent upon the age of the person as shown below. The relationship is linear.

Age	Maximum Heart Rate
10	210
15	205
20	200
25	195
30	190
35	185
40	180
45	175
50	170

In your Answer Document, copy and complete the table.

Write an equation that can be used to find the maximum heart rate for any age. Show your work or provide an explanation for how you determined your equation.

$$HR = 220 - age$$

13. Mr. Richards needs to price items that must be sold within 90 days, and he has two options. In Option A, Mr. Richards prices items at \$225 and gives \$1.00 off the price for every day that the item does not sell.

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Use the equations to find the day on which the two options yield the same price.

Day 25

Day	0	1	2	3	4	5	10	15	20	25
A	225	224	223	222	221	220	210	210	205	200
B	250	248	246	244	242	240	230	220	210	200

14. Michael paid \$6.00 for a ticket to a football game. Soft drinks at the game cost \$0.75. Michael bought x drinks at the game. Which equation represents the total amount (y) he spent?

A. $y = (6 + 0.75)x$
yes

B. $y = 6x + 0.75$
yes

C. $y = 6 - 0.75x$
no

D. $y = 6 + 0.75x$
yes

think 1 soda $0.75 + 6 = 6.75$ try 1 look for 6.75

15. The table shows values for a function.

2 sodas $1.50 + 6 = 7.50$

x	y
1	4
2	9
3	16
4	25

try 4 look for 25

Which equation represents this function?

~~A. $y = x^2$~~

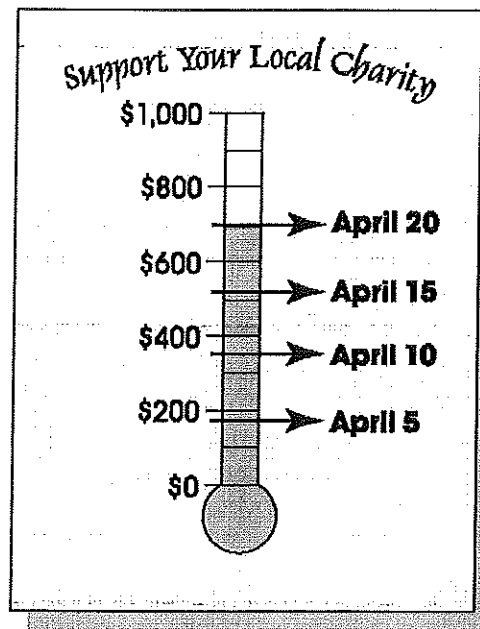
B. $y = x^2 + 1$

C. $y = (x - 1)^2$

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$\$700$ in 20 days is $\frac{700}{20} = \$35$ per day

$$\frac{1000}{35} = \frac{35d}{35}$$

$$28.56 = d$$

29th day.