

Notes T3-55, What Comes Next? What Comes Later?

For each of the following tables:

- Describe how to find the next term in the sequence.
- Find the next term in the table.
- Tell whether the sequence is arithmetic or geometric or neither.
- Write a recursive rule for the sequence.
- Write an explicit rule for the sequence.
- Tell if the sequence could represent a linear function, an exponential function, or neither.

Example

x	f(x)
0	5
1	8
2	11
3	14
4	f(4)
...	...

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| a) To find the next term, add 3 to the previous term |
| b) Next term in the table: $f(4) = 17$               |
| c) Type of sequence: <b>arithmetic</b>               |
| d) Recursive Rule: $f(0) = 5, f(x+1) = f(x) + 3$     |
| e) Explicit Rule: $f(x) = 5 + 3x$                    |
| f) Type of function: <b>linear</b>                   |

1)

x	f(x)
1	1
2	2
3	4
4	8
5	f(5)
...	...

$\frac{4}{2} = 2$   
 $\frac{8}{4} = 2$

$2 - 1 = 1$   
 $4 - 2 = 2$   
 $8 - 4 = 4$

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|--|
| a) To find the next term, multiply by 2              |
| b) Next term in the table: $f(5) = 16$               |
| c) Type of sequence: <b>Geometric</b>                |
| d) Recursive Rule: $f(1) = 1, f(x+1) = f(x) \cdot 2$ |
| e) Explicit Rule: $f(x) = \frac{1}{2}(2)^x$          |
| f) Type of function: <b>Exponential</b>              |

2)

x	f(x)
0	-2
1	10
2	-50
3	250
4	f(4)
...	...

$\frac{10}{-2} = -5$   
 $\frac{-50}{10} = -5$   
 $\frac{250}{-50} = -5$

$10 - (-2) = 12$   
 $-50 - 10 = -60$

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|--|
| a) To find the next term, multiply by -5               |
| b) Next term in the table: $f(4) = -1,250$             |
| c) Type of sequence: <b>Geometric</b>                  |
| d) Recursive Rule: $f(0) = -2, f(x+1) = f(x) \cdot -5$ |
| e) Explicit Rule: $f(x) = -2(-5)^x$                    |
| f) Type of function: <b>Exponential</b>                |

3)

x	f(x)
1	5
2	8
3	13
4	21
5	f(5)
...	...

$\frac{8}{5} = \frac{8}{5}$   
 $\frac{13}{8} = \frac{13}{8}$   
 $\frac{21}{13} = \frac{21}{13}$

$8 - 5 = 3$   
 $13 - 8 = 5$   
 $21 - 13 = 8$

- |   |
|---|
| a) To find the next term, add the next term + 2 |
| b) Next term in the table: $f(5) = 30$          |
| c) Type of sequence: <b>neither</b>             |
| d) Recursive Rule: $—$                          |
| e) Explicit Rule: $—$                           |
| f) Type of function: <b>neither.</b>            |

Each of the tables below represents an arithmetic sequence. Find the missing terms in the sequence. Show how you figured it out.

x	f(x)
1	5
2	8
3	11

$+3$   
 $\frac{11-5}{2} = \frac{6}{2}$   
 $d = 3$

$\frac{\text{difference}}{\text{steps}} = d$

x	f(x)
1	-4
2	2
3	8
4	14

$+6$   
 $\frac{14-4}{4-1} = \frac{10}{3}$   
 $d = 6$

x	f(x)
1	18
2	11
3	4
4	-3
5	-10

$-7$   
 $\frac{-10-18}{5-1} = \frac{-28}{4}$   
 $d = -7$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x} = d$

Each of the tables below represents a geometric sequence. Find the missing terms in the sequence. Show how you figured it out.

x	f(x)
1	3
2	6
3	12

$r$ : ratio  
 $r = 2$

$\frac{12}{3} = r^{(steps)}$   
 $\frac{12}{3} = r^2$   
 $4 = r^2$   
 $r = 2$

x	f(x)
1	2
2	6
3	18
4	54

$r = 3$   
 $\frac{54}{2} = r^3$   
 $27 = r^3$   
 $r = 3$

x	f(x)
1	6
2	12
3	24
4	48
5	96

$r = 2$   
 $\frac{96}{6} = r^4$   
 $16 = r^4$   
 $2 \cdot 16 = r^4$   
 $r = 2$