Lesson 1.8 Notes

x	y
1	5
2	10
3	20
4	40
5	?
…	…
n	?

Describe the pattern.	Recursive rule:	Explicit rule:	Arithmetic, Geometric, or Neither?
Each term is twice as much as the term before it. So, we are multiplying by two.	$f(0) = 2.5$ $f(x) = f(x-1) \cdot 2$	$f(x) = 2^x \cdot 2.5$	Geometric

x	y
1	-8
2	-17
3	-26
4	-35
5	-44
6	-53
…	…
n	?

Describe the pattern.	Recursive rule:	Explicit rule:	Arithmetic, Geometric, or Neither?
Each term is 9 less than the previous term. So, we are subtracting 9.	$f(0) = 1$ $f(x) = f(x-1) - 9$	$f(x) = -9x + 1$	Arithmetic

x	y
1	2
2	6
3	18
4	54
5	162
6	486
…	…
n	?

Describe the pattern.	Recursive rule:	Explicit rule:	Arithmetic, Geometric, or Neither?
Each term is three times as much as the term before it. So, we are multiplying by three.	$f(0) = \frac{2}{3}$ $f(x) = f(x-1) \cdot 3$	$f(x) = 3^x \cdot \frac{2}{3}$	Geometric

x	y
1	3
2	15
3	27
4	39
5	51
6	?
…	…
n	?

Describe the pattern.	Recursive rule:	Explicit rule:	Arithmetic, Geometric, or Neither?
Each term is 12 more than the previous term. So, we are adding 12.	$f(0) = -9$ $f(x) = f(x-1) + 12$	$f(x) = 12x - 9$	Arithmetic

x	y
0	1
1	$1\frac{3}{5}$
2	$2\frac{1}{5}$
3	$2\frac{4}{5}$
4	$3\frac{2}{5}$
5	4
…	…
n	?

Describe the pattern.	Recursive rule:	Explicit rule:	Arithmetic, Geometric, or Neither?
Each term is $\frac{3}{5}$ more than the previous term.** So, we are adding $\frac{3}{5}$.	$f(0) = 1$ $f(x) = f(x-1) + \frac{3}{5}$	$f(x) = \frac{3}{5}x + 1$	Arithmetic

**If you change all of the y-values to improper fractions with denominators of 5 it becomes more clear: $\frac{5}{5}, \frac{8}{5}, \frac{11}{5}, \frac{14}{5}, \frac{17}{5}, \frac{20}{5}, \ldots$

x	y
1	10
2	2
3	$\frac{2}{5}$
4	$\frac{2}{25}$
5	$\frac{2}{125}$
6	$\frac{2}{625}$
…	…
n	?

Describe the pattern.	Recursive rule:	Explicit rule:	Arithmetic, Geometric, or Neither?
Each term is being divided by 5. So, we are multiplying by $\frac{1}{5}$.	$f(0) = 50$ $f(x) = f(x-1) \cdot \frac{1}{5}$	$f(x) = \left(\frac{1}{5}\right)^x \cdot 50$	Geometric

x	y
1	-1
2	0.2
3	-0.04
4	0.008
5	-0.0016
6	0.00032
…	…
n	?

Describe the pattern.	Recursive rule:	Explicit rule:	Arithmetic, Geometric, or Neither?
Each term is being multiplied by 0.2.* Since the sign is alternating from positive to negative we are multiplying by -0.2.	$f(0) = 5$ $f(x) = f(x-1) \cdot (-0.2)$	$f(x) = (-0.2)^x \cdot 5$	Geometric

*Since the decimals are adding one zero in front of the number, I know it is mutliplying by 0.2, not 2.

x	y
0	3
1	4
2	7
3	12
4	19
5	?
…	…
n	?

Describe the pattern.	Recursive rule:	Explicit rule:	Arithmetic, Geometric, or Neither?
Each term adds an increasing odd number.	$f(0) = 3$ $f(x) = f(x-1) + 2x - 1$	$f(x) = x^2 + 3$	Neither

***I do not expect you to be able to write the recursive and explicit rule for a function that is "neither".

Other important notes from today:

Find the constant ratio for each geometric sequence.

1) 16, 24, 36, ... $\frac{36}{24} = 1.5,\ \frac{24}{16} = 1.5$ The constant ratio is 1.5.

2) $\frac{5}{2}, \frac{5}{3}, \frac{10}{9}$, ... $\frac{10}{9} \div \frac{5}{3} = 1.5,\ \frac{5}{3} \div \frac{5}{2} = 1.5$ The constant ratio is 1.5.

3) 81, 108, 144, ... $\frac{144}{108} = \frac{4}{3},\ \frac{108}{81} = \frac{4}{3}$ The constant ratio is $\frac{4}{3}$.

Fill in the blanks for each table, then write the recursive and explicit equation for each sequence.

1) .

x	y
1	4
2	16
3	64
4	256
5	1,024

Recursive:

$f(0) = 1$

$f(x) = f(x-1) \cdot 4$

Explicit:

$f(x) = 4^x$

2) .

x	y
1	3
2	5
3	7
4	9
5	11

Recursive:

$f(0) = 1$

$f(x) = f(x-1) + 2$

Explicit:

$f(x) = 2x + 1$

3) .

x	y
1	-64
2	-16
3	-4
4	-1
5	$-\frac{1}{4}$

Recursive:

$f(0) = -256$

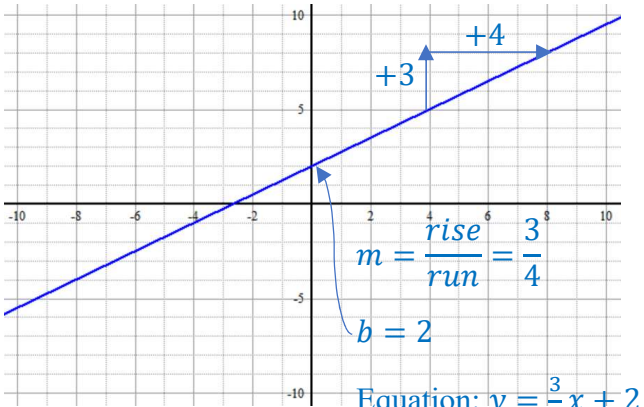
$f(x) = f(x-1) \cdot \frac{1}{4}$

Explicit:

$f(x) = \left(\frac{1}{4}\right)^x \cdot (-256)$

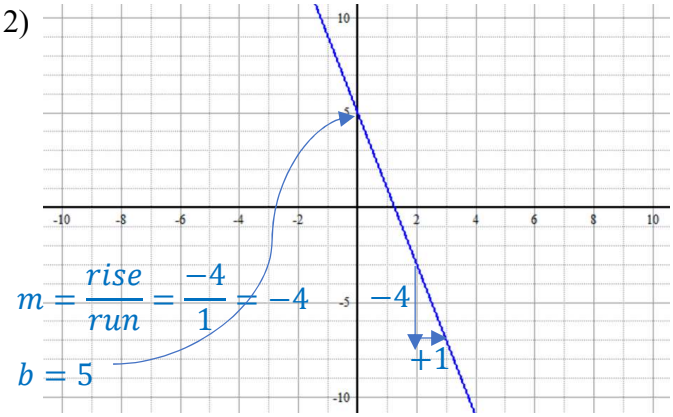
Write each equation of the line in $y = mx + b$ form.

1)



Equation: $y = \frac{3}{4}x + 2$

2)



Equation: $y = -4x + 5$