1. 19, 14, 9, 4, ...

d = −5

Explicit: $a_n = -5n + 24$

Recursive: $a_n = a_{n-1} - 5$, $a_1 = 19$

52nd term: −236

$\frac{14-19}{2-1} = \frac{-5}{1} = -5$

$a_n = 19 - 5(n-1)$

$19 - 5n + 5$

$-5n + 24$ ← 0 term

$-5(52) + 24$

-236

2.

x	y
0	1
1	4
2	7
4	13
5	16

d = 3

Explicit: $a_n = 3n + 1$

Recursive: $a_n = a_{n-1} + 3$, $a_1 = 4$

52nd term: 157

$\frac{4-1}{2-1} = \frac{3}{1} = 3$

$3(52) + 1$

157

3. 9, 22, 35, 48, 61, …

+13

d = 13

Explicit: $a_n = 13n - 4$

Recursive: $a_n = a_{n-1} + 13$, $a_1 = 9$

52nd term: 672

$\frac{61-9}{5-1} = \frac{52}{4} = 13$

$a_n = 9 + 13(n-1)$

$9 + 13n - 13$

$13n - 4$

$13(52) - 4$

672

4. You plant 15 flowers in your first row of the flower garden, 22 flowers in the second row of the flower garden, and 29 flowers in the third row of the flower garden.

15, 22, 29, ...

$\frac{22-15}{2-1} = \frac{7}{1} = 7$

d = 7

Explicit: $a_n = 7n+8$

Recursive: $a_n = a_{n-1} + 7$, $a_1 = 15$

52nd term: 372

$a_n = 15 + 7(n-1)$

$15 + 7n - 7$

$7n + 8$

$7(52)+8$

372

5. How many flowers are in the 10th row from problem #4?

$7(10)+8 =$ 78 flowers

6. At what row do you have 99 flowers from problem #4?

$99 = 7n+8$

$-8 \quad -8$

$\frac{91}{7} = \frac{7n}{7}$

13th Row

7. Given the 25th term and the common difference, find the 45th term.

$a_{25} = 210$ $\quad d = 5$

$a_n = a_1 + d(n-1)$

$210 = a_1 + 5(25-1)$

$210 = a_1 + 5(24)$

$210 = a_1 + 120$

$-120 \quad -120$

$a_1 = 90$

$a_n = a_1 + d(n-1)$

$a_{45} = 90 + 5(45-1)$

$a_{45} = 310$

8. Given the 2nd term and the 7th term, create the explicit and recursive formula.

$a_2 = 2$ $\quad a_7 = 17$

$d = \frac{17-2}{7-2} = \frac{15}{5} = 3$

$a_1 = -1$

x	y	
1	-1	-3 (opposite of d)
2	2	
3	5	+3

Explicit: $a_n = -1 + 3(n-1)$

$-1 + 3n - 3$

$a_n = 3n - 4$

Recursive: $a_n = a_{n-1} + 3$, $a_1 = -1$

9. Given the recursive formula, create the explicit formula:

$a_1 = 4 \quad a_n = a_{n-1} + 3$

$a_n = 4 + 3(n-1)$

$a_n = 4 + 3n - 3$

$\boxed{a_n = 3n + 1}$

10. How much does Scott weigh on day 30 if he weighed 342 lbs. on his first day stepping on the scales and lost 1.5 pounds each day?

a_1

$d = -1.5$

$a_{30} = 342 - 1.5(30-1)$

$342 - 1.5(29)$

298.5

* On day 30, Scott weighed 298.5 pounds.

1.

X	Y
0	3
1	15
2	75

$\frac{15}{3} = 5$

r = 5

Explicit: $a_n = 15(5)^{n-1}$ -OR- $3(5)^n$

Recursive: $a_n = 5 \cdot a_{n-1}$, $a_1 = 15$

12th term: 732421,875

$3(5)^{12}$

2.

X	Y
0	4
1	2
2	1

$\frac{2}{4} = \frac{1}{2}$

r = $\frac{1}{2}$

Explicit: $a_n = 2\left(\frac{1}{2}\right)^{n-1}$ -OR- $4\left(\frac{1}{2}\right)^n$

Recursive: $a_n = \frac{1}{2} \cdot a_{n-1}$, $a_1 = 2$

12th term: 0.00098

$4\left(\frac{1}{2}\right)^{12}$ 6 rounds the 7 up

X	1	2	3	4	5
Y	5	15	45	135	405

3.

r = 3

Explicit: $a_n = 5(3)^{n-1}$

Recursive: $a_n = 3 \cdot a_{n-1}$, $a_1 = 5$

12th term: 885,735

$5(3)^{12-1}$

x	y
1	5
5	405

$5-1 = 4$

$\frac{405}{5} = 81$

$\sqrt[4]{81} = 3$

4. You are on a 10-day cruise with 5 people that boarded the ship not knowing that they had just contracted the swine flu which is highly contagious. Every day, the number of people infected with swine flu quadrupled.

r = 4

Explicit: $a_n = 5(4)^n$

Recursive: $a_n = 5 \cdot a_{n-1}$, $a_0 = 5$

12th term: 83,886,080 people

$5(4)^{12}$

5. At what day will there be 320 people infected with swine flu?

$\frac{320}{5} = \frac{5(4)^n}{5}$

$64 = 4^n$ ← 4 to what power = 64

Day 3

$4^1 = 4$
$4^2 = 16$
$4^3 = 64$

6. If the ship holds 6000 people, how many days will it take for everyone on the ship to be infected with the swine flu?

We know day 3 = 320

$5(4)^4 \rightarrow 1280$

$5(4)^5 \rightarrow 5120$

$5(4)^6 \rightarrow 20{,}480$

Sometime during Day 6, all the people are infected!

7. Given the explicit formula, create the recursive formula.

$a_n = -3(5)^n$ 0-term because 5 is not raised to n-1

$a_n = 5 \cdot a_{n-1}$, $a_1 = -15$

8. Given the 2nd term and the 7th term of a geometric sequence, create the explicit formula.

$a_2 = -10$ $a_7 = 320$

$a_n = -10(-2)^{n-2}$

x	y
2	-10
7	320

7-2=5

$\frac{320}{-10} = -32$

$\sqrt[5]{-32} = -2$ ← ratio

9. How many **feet** tall is Jack's bean stalk on day 25 if it starts out at 12 **inches** tall and doubles every day?

0-term r

$a_n = 12(2)^n$

$a_{25} = 12(2)^{25}$

$\left(\frac{402653184 \text{ in}}{1}\right)\left(\frac{1 \text{ ft.}}{12 \text{ in.}}\right) =$ 33,554,432 ft.

10. On what day will Jack's bean stalk be over 1500 **inches** tall?

$12(2)^5 = 384$

$12(2)^6 = 768$

$12(2)^7 = 1536$

On day 7

$f(x) = -2x + 7$ $g(x) = 2x^2 - 13$

1. $g(-2)$ $2(-2)^2-13$
$2(4)-13$
$8-13$
-5

2. $f(x) = -11$, $x =$ ____
$-11=-2x+7$
$-7 \quad -7$
$-18=-2x$
$\frac{-18}{-2}=\frac{-2x}{-2}$
$x=9$

3. $f(-22)$ $-2(-22)+7$
$44+7$
51

4. $g(x) = 85$, $x =$ ____
$85=2x^2-13$
$+13 \quad +13$
$\frac{98}{2}=\frac{2x^2}{2}$
$49=x^2$
$\sqrt{49}=\sqrt{x^2}$
$x=7$

1: -7 $-3,\ 1,\ 5,\ 9, \ldots$ (−4)

Circle one: Arithmetic or Geometric

Common difference or ratio: 4

Explicit Formula: $a_n = 4n - 7$

Recursive Formula: $a_n = a_{n-1} + 4, a_1 = -3$

12th term: 41

$4(12)-7$
$48-7$

2. $3, -9, 27, -81, \ldots$

Circle one: Arithmetic or Geometric

Common difference or ratio: -3

Explicit Formula: $a_n = 3(-3)^{n-1}$

Recursive Formula: $a_n = -3 \cdot a_{n-1}, a_1 = 3$

12th term: $-531,441$

$3(-3)^{12-1}$

3. $a_n = -8n + 11$

Circle one: Arithmetic or Geometric

Common difference or ratio: -8

Circle which is given: Explicit Formula or Recursive Formula

Write the formula that is NOT given: $a_n = a_{n-1} - 8, a_1 = 3$

12^{th} term: -85

$-8(1)+11$
$-8+11$
3

$-8(12)+11$

4. $a_n = 6 \cdot a_{n-1}$, $a_1 = 2$

Circle one: Arithmetic or Geometric

Common difference or ratio: 6

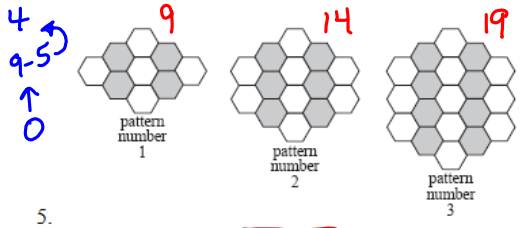
Circle which is given: Explicit Formula or Recursive Formula

Write the formula that is NOT given: $a_n = 2(6)^{n-1}$

12^{th} term: $725,594,112$

$2(6)^{12-1}$

5.



Circle one: Arithmetic or Geometric

Common difference or ratio: 5

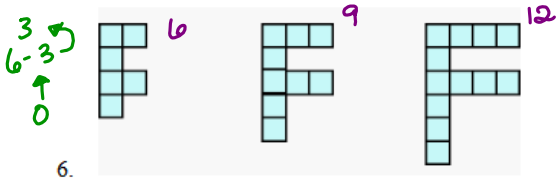
Explicit Formula: $a_n = 5n + 4$

Recursive Formula: $a_n = a_{n-1} + 5, a_1 = 9$

12^{th} term: 64

$5(12)+4$

6.



Circle one: Arithmetic or Geometric

Common difference or ratio: 3

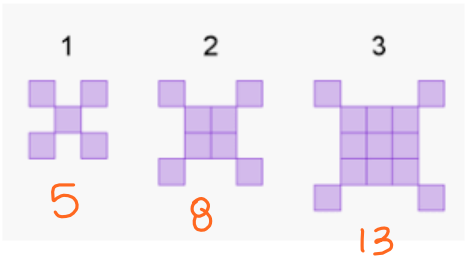
Explicit Formula: $a_n = 3n + 3$

Recursive Formula: $a_n = a_{n-1} + 3, a_1 = 6$

12^{th} term: 39

$3(12)+3$

7. Explain why the following figure is NEITHER arithmetic nor geometric:



$8-5=3$
$13-8=5$
No common difference

$\frac{13}{8} = 1.625$

$\frac{8}{5} = 1.6$ No constant ratio

There is no common difference because it does not add or subtract by the same amount so it is not arithmetic.
There is no constant ratio because it does not multiply by the same amount each time so it is not geometric either.