Writing Sequences in Recursive & Explicit Form

1) 2, 4, 6, 8, 10, ... (+2 +2 +2 +2)

a) Recursive

$a_1 = 2$

$a_n = a_{n-1} + 2$

b) Explicit

2, 4, 6, 8, 10

n=1 n=2 n=3 n=4 n=5

$a_n = 2n$

(+2)

n	a_n
1	2 (+2)
2	4 (+2)
3	6 (+2)
4	8 (+2)
5	10 (+2)

c) $a_6 = 2(6)$ $a_7 = 2(7)$

$a_6 = 12$ $a_7 = 14$

d) $a_{10} = 2(10)$

$a_{10} = 20$

2) 4, 11, 18, 25, 32 ... (+7 +7)

a) Recursive

$a_1 = 4$

$a_n = a_{n-1} + 7$

b) Explicit

4, 11, 18, 25, 32

$a_n = 7n - 3$

c) $a_6 = 7(6) - 3 = 39$

$a_7 = 7(7) - 3 = 46$

d) $a_{10} = 7(10) - 3 = 67$

n	7n	Adjustment	a_n
1	7	-3	4 (+7)
2	14	-3	11 (+7)
3	21	-3	18 (+7)
4	28	-3	25 (+7)
5	35	-3	32 (+7)

3) 1, 2, 4, 8, 16 (×2 ×2 ×2 ×2)

a) Recursive

$a_1 = 1$

$a_n = 2a_{n-1}$

b) Explicit

$a_n = 2^{n-1}$

n	a_n
1	1
2	2 (+1, ·2)
3	4 (+2, ·2)
4	8 (+4, ·2)
5	16 (+8, ·2)

base

c) $a_6 = 2^{6-1}$ $a_7 = 2^{7-1}$

$a_6 = 2^5$ $a_7 = 2^6$

$a_6 = 32$ $a_7 = 64$

d) $a_{10} = 2^{10-1}$

$a_{10} = 2^9$

$a_{10} = 512$

4) 13, −2, −17, −32, −47 (−15 −15 −15 −15)

a) Recursive

$a_1 = 13$

$a_n = a_{n-1} - 15$

b) Explicit

$a_n = -15n + 28$

n	−15n	+28	a_n
1	−15	+28	13
2	−30	+28	−2
3	−45	+28	−17
4	−60	+28	−32
5	−75	+28	−47

c) $a_6 = -62$ $a_7 = -77$

d) $a_{10} = -122$

-5 -5 -5

5) 125, 120, 115, 110, 105

A) Recursive

$a_1 = 125$

$a_n = a_{n-1} - 5$

b) Explicit

$a_n = -5n + 130$

n	-5n	+130	a_n
1	-5	+130	125
2	-10	+130	120
3	-15	+130	115
4	-20	+130	110
5	-25	+130	105

c) $a_6 = 100$

$a_7 = 95$

d) $a_{10} = 80$

Ex:

$1, \frac{3}{4}, \frac{5}{9}, \frac{7}{16}, \frac{9}{25}$

+2 +2 +2 +2

$\frac{1}{1}, \frac{3}{4}, \frac{5}{9}, \frac{7}{16}, \frac{9}{25}$

$a_n = \frac{2n-1}{n^2}$

n=1 n=2 n=3 n=4 n=5