Harder Patterns #2 (Exponentials)

Write the equations for these patterns:

1

x	y
1	2
2	4
3	8
4	16
5	32

2

n	p
1	21
2	63
3	189
4	567
5	1701

3

x	y
1	16
2	8
3	4
4	2
5	1

4

x	y
1	1
2	3
3	9
4	27
5	81

5

a	b
1	12
2	36
3	108
4	324
5	972

6

x	y
1	1000
2	100
3	10
4	1
5	0.1

7

a	b
1	4
2	8
3	16
4	32
5	64

8

a	b
1	30
2	150
3	750
4	3750
5	18750

9

x	y
1	48
2	72
3	108
4	162
5	243

10. For the pattern: 1, 2, 4, 8, 16, 32, …

    What is the 20th term in the pattern?

11. For the pattern $k = 2.13^{n-112}$, when does the value of k first exceed 1?

12. For which term is the pattern: 4, 16, 64, 256 … the same value as the pattern 512, 1024, 2048, 4096, 8182 … ?

Harder Patterns #2 – Answers

1 $y = 2^x$

2 $p = 7 \times 3^n$

3 $y = 2^{-x+5}$ or $y = 0.5^{x-5}$ (technically also $y = 32 \times 0.5^x$)

4 $y = 3^{x-1}$ (technically also $y = {}^1/_3 \times 3^x$)

5 $b = 4 \times 3^a$

6 $y = 10^{-x+4}$ or $y = 0.1^{x-4}$ (technically also $y = 10\,000 \times 0.1^x$)

7 $y = 2^{x+1}$ (technically also $y = 2 \times 2^x$)

8 $b = 6 \times 5^a$

9 $y = 32 \times 1.5^x$

10 Formula is 2^{x-1}, so $2^{19} = 524\,288$

11 $2.13^{n-112} = 1$ when $n = 112$, because $2.13^0 = 1$.

113th term will be the first over 1.

12 When $4^x = 2^{x+8}$

$(2^2)^x = 2^{x+8}$

$2^{2x} = 2^{x+8}$

$2x = x + 8$

$x = 8$ so the 8th term for each