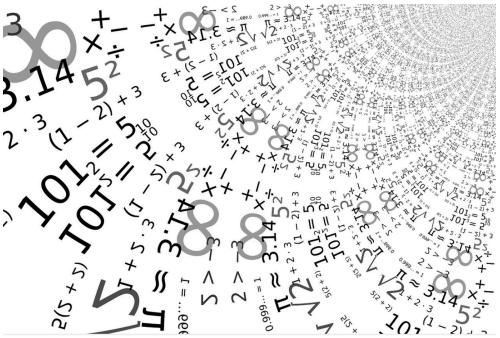
Sequences puzzles



1. Can you find the next term for these sequence?

(a), 4, 16, 64, 256, 1024
[Geometric ×4]

(b), 45, 41, 37, 33, 29
[Arithmetic -4]

(c), 99, 92, 86, 81, 77, 74
[Quadratic second difference = 1

(d), 1, 2, 6, 24, 120, 720
[×2,×3,×4 *etc.*]

(e), 1, 1, 2, 3, 5, 8, 13
[Fibonacci sequence add previous two terms]

(f), 3, 9, 27, 81, 243, 729
[Powers of 3]

2. Can you find the next term for these sequence?

(a), 1, 11, 21, 1211, 111221, 312211, 13112221
[Read out aloud the previous term, one one, two ones, one two one one, one one one two two ones etc.]

(b), O, T, T, F, F, S, S
[First letters of counting numbers one, two three four etc.]

(c), M, V, E, M, J, S
[Planets in order]

3. Below are 2 terms in some sequences. Have a guess at the rule, then your teacher will reveal the next number. See how quickly you can guess the rule!

Teachers note: There are lots of ways of doing this activity – the easiest is to give all students the question on the worksheet. Students then put their hands up to guess the next term. Points are awarded for a correct guess. If no guesses are correct then the next number is revealed. When students believe they have found the rule they write it down. This is a popular activity in maths competitions.

(a)

4	**7**	**2**	**5**	**10**	**-1**	**0**	**1**
15	**127**	**3**	**31**	**1023**	**-0.5**	**0**	**1**

Rule.....$2^n - 1$.....

(b)

10	**1**	**6**	**13**	**8**	**0**	**3**	**100**
4	**1**	**2**	**5**	**3**	**0**	**1**	**34**

Rule.....$\left\lceil \frac{n}{3} \right\rceil$ (The ceiling function – round up to the nearest integer) .....

(c)

4	**1**	**2**	**8**	**18**	**5**	**100**	**7**
4	**3**	**3**	**5**	**8**	**4**	**10**	**5**

Rule.....Letters in word written in English.....

(d)

1	**2**	**3**	**5**	**8**	**12**	**17**	**20**
1	**2**	**2**	**2**	**4**	**6**	**2**	**6**

Rule.....Number of factors.....

(e)

4	**11**	**-1**	**8**	**2**	**0**	**3**	**9**
1	**15**	**-9**	**9**	**-3**	**-7**	**-1**	**11**

Rule.....$2n - 7$.....

(f)

2	8	7	3	9	5	10	1
10	1000	111	11	1001	101	1010	1

Rule……Binary representation……