1) Write down the first 5 terms for the following sequences

a) $u_{n+1} = 4u_n + 3,$ $u_1 = 2$ b) $u_n = 2n - 5$

c) $u_{n+1} = \frac{6}{u_n+2},$ $u_1 = 0$ d) $u_n = n^2 - 4n$

e) $u_n = 3^{n+1}$ f) $u_n = (n+3)(n-1)$

2) Find the nth term formulae for the following sequences

a) 8, 11, 14, 17, 20, ... b) 7, 8, 11, 16, 23, ... c) 18, 16, 14, 12, 10, ...

3) A sequence is defined by $u_{n+1} = 2u_n + 3$ if $u_3 = 25$, find u_1

4) A function machine is defined as follows:

a) find the output from the function machine if the input is 3
b) find the input into the function machine if the output is 47
c) by forming an equation, find the input to make the output twice as large.
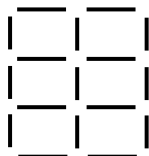
5) If $y = 2x - 1$ and $x = 3 - 6t$
Find the value of y if $t = -1$

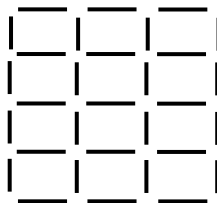6) The patterns below are made from matchsticks.
By writing down the sequence, and finding the nth term rule, find the number of matchsticks used in the 10th pattern
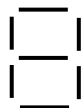
Pattern 1   Pattern 2   Pattern 3

7) For the following functions:

$f(x) = 5 - 2x$ $g(x) = x^2 - 3$ $h(x) = \frac{3}{x-4}$

find:

a) $f(2)$ b) $g(4)$ c) $h(10)$ d) $ff(1)$ e) $hg(4)$

find and simplify:

f) $f(x+2)$ g) $g(x-2)$ h) $h(3x)$ i) $f^{-1}(x)$ j) $h^{-1}(x)$

8) Solve
a) $f(x) = 2$ b) $f(x) = g(x)$ c) $h(4x) = 2$

Ans   1a) 2, 11, 47, 191, 767   b) -3, -1, 1, 3, 5   c) 0, 3, $\frac{6}{5}, \frac{15}{18}, \frac{48}{31}$ d) -3, -4, -3, 0, 5   e) 9, 27, 81, 243, 729
f) 0, 5, 12, 21, 32   2a) 3n+5   b) n²-2n+8   c) -2n+20   3) 4   4a) 7   b) 13   c) 2.5   5) 17   6) 241   7a) 1   b) 13   c) 0.5
d) -1   e) 1/3   f) $1 - 2x$ g) $x^2 - 4x + 1$ h) $\frac{3}{3x-4}$ i) $\frac{5-x}{2}$ j) $\frac{3}{x} + 4$ 8a) $\frac{3}{2}$ b) -4, 2   c) $\frac{11}{8}$