June 6th

Sequences

Sequence - a set of patterned numbers (usually separated by commas)

Examples of Sequences

1) 5,7,9,11
2) 2,8,14,20,26,32
3) 1,3,9,27,....

x	y
0	3
1	5
2	7
3	9
4	11

$\rightarrow y = 2x + 3$

An Investigation of Each Example

1) 5,7,9,11 — 4 terms

$t_1 = 5$ $t_3 = 9$
$t_2 = 7$ $t_4 = 11$

Pattern: ★ Starts at 5, increases by 2 each term

Equation: $t_n = 2n + 3$

2) 2,8,14,20,26,32 — 6 terms

$t_1 = 2$ $t_4 = 20$
$t_2 = 8$ $t_5 = 26$
$t_3 = 14$ $t_6 = 32$

Pattern: ★ starts at 2, increases by 6 each term

Equation: $t_n = 6n - 4$

3) 1,3,9,27,... — infinate # of terms

$t_1 = 1$
$t_2 = 3$
$t_3 = 9$
$t_4 = 27$

Pattern: ★ Starts at 1, multiplies by 3 each term

Equation: $t_n = 3^{n-1}$

Example 1 List the first 5 terms of the sequence determined by

(a) $t_n = (n-1)^2$ (b) $t_n = 2^{n+1} - 1$

$t_1 = (0)^2 = 0$ $t_4 = (3)^2 = 9$
$t_2 = (1)^2 = 1$ $t_5 = (4)^2 = 16$
$t_3 = (2)^2 = 4$

$t_1 = 2^2 - 1 = 3$
$t_2 = 2^3 - 1 = 7$
$t_3 = 15$
$t_4 = 31$
$t_5 = 63$

Example 2 Find t_6 and t_{15} given the defining equation $t_n = \frac{n-2}{2}$

$t_6 = \frac{6-2}{2} = 2$ $t_{15} = \frac{15-2}{2} = \frac{13}{2}$

Example 3 Determine a formula for t_n given the sequence

(a) 1,4,9,16,...
(b) 3,4,5,6,....
(c) –2,4,-8,16,-32,....

a) $t_n = n^2$ b) $t_n = n+2$ c) $t_n = (-2)^n$