Generating Quadratic Sequences

By finding the first and second differences, decide whether each of these sequences is quadratic.

(a) $1, 5, 11, 19, 29, 41$

(b) $2, 5, 8, 11, 14, 17$

(c) $0, 8, 22, 41, 68, 98$

(d) $2, 9, 20, 35, 54, 77$

(e) $4, 1, 0, 1, 4, 9$

(f) $6, 17, 36, 65, 98, 141$

(g) $18, 37, 62, 93, 130, 173$

(h) $3, 9, 23, 43, 75, 113$

(i) $-10, -4, 12, 38, 74, 120$

(j) $17, 39, 69, 107, 153, 207$

(a) Yes
(b) No
(c) No
(d) Yes
(e) Yes
(f) No
(g) Yes
(h) No
(i) Yes
(j) Yes

Generate the first five terms of each of these quadratic sequences.

(a) $n^2 + 10$ (b) $n^2 - 1$

(c) $n^2 + n$ (d) $n^2 + 2n + 1$

(e) $n^2 - 3n$ (f) $n^2 - n - 2$

(g) $2n^2 + 5$ (h) $3n^2 - 7$

(i) $2n^2 + n - 5$ (j) $(4n - 1)(n + 1)$

(a) 11, 14, 19, 26, 35
(b) 0, 3, 8, 15, 24
(c) 2, 6, 12, 20, 30
(d) 4, 9, 16, 25, 36
(e) -2, -2, 0, 4, 10
(f) -2, 0, 4, 10, 18
(g) 7, 13, 23, 37, 55
(h) -4, 5, 20, 41, 68
(i) -2, 5, 16, 31, 50
(j) 6, 21, 44, 75, 114

Find the 10^{th} and 50^{th} term of the following quadratic sequences.

(a) $n^2 + 5$ (b) $n^2 - 2$

(c) $n^2 - n$ (d) $n^2 + 2n$

(e) $n^2 - 3n + 1$ (f) $n^2 - n - 2$

(g) $4n^2 + 1$ (h) $3n^2$

(i) $2n^2 + n - 1$ (j) $n(5n + 3)$

(a) 105, 2505 (b) 98, 2498
(c) 90, 2450 (d) 120, 2600
(e) 71, 2351 (f) 88, 2448
(g) 401, 10001 (h) 300, 7500
(i) 209, 5049 (j) 530, 12650

The first four terms of a quadratic sequence are 0, 4, 10, 18, ... If the nth term is $n^2 + an + b$, find the values of a and b.

$0 = 1 + a + b$ $\quad a + b = -1$

$4 = 4 + 2a + b$ $\quad 2a + b = 0$

$a = 1, \; b = -2$