

GCSE MATHEMATICS topic sheet.

n^{th} TERMS

For each of the following sequences, find a formula for the n^{th} term.

- 1) a) 2, 5, 8, 11, 14, b) 2, 3, 4, 5, 6, c) 4, 9, 14, 19, 24,
 d) 7, 9, 11, 13, 15, e) -2, 3, 8, 13, 18, f) 0, 2, 4, 6, 8,
 g) 1, 2, 3, 4, 5, h) 3, 6, 9, 12, 15, i) 1, 7, 13, 19, 25,
 j) 8, 12, 16, 20, 24, k) -4, 0, 4, 8, 12, l) 20, 30, 40, 50, 60,
- 2) a) 30, 27, 24, 21, 18, b) 25, 23, 21, 19, 17, c) 16, 15, 14, 13, 12,
 d) 100, 90, 80, 70, 60, e) 55, 50, 45, 40, 35, f) 10, 7, 4, 1, -2,
 g) 21, 16, 11, 6, 1, h) 5, 4, 3, 2, 1, i) 40, 36, 32, 28, 24,
 j) 1, 0, -1, -2, -3, k) 300, 250, 200, 150, l) -1, -2, -3, -4, -5,
- 3) a) $\frac{1}{2}, \frac{3}{5}, \frac{5}{8}, \frac{7}{11}, \frac{9}{14}, \dots\dots$ b) $\frac{3}{5}, \frac{6}{7}, \frac{9}{9}, \frac{12}{11}, \frac{15}{13}, \dots\dots$ c) $\frac{1}{6}, \frac{5}{11}, \frac{9}{16}, \frac{13}{21}, \frac{17}{26}, \dots\dots$
 d) $\frac{10}{2}, \frac{11}{4}, \frac{12}{6}, \frac{13}{8}, \frac{14}{10}, \dots\dots$ e) $\frac{5}{6}, \frac{15}{10}, \frac{25}{14}, \frac{35}{18}, \frac{45}{22}, \dots\dots$ f) $\frac{4}{5}, \frac{7}{6}, \frac{10}{7}, \frac{13}{8}, \frac{16}{9}, \dots\dots$
 g) $\frac{30}{2}, \frac{27}{6}, \frac{24}{10}, \frac{21}{14}, \frac{18}{18}, \dots\dots$ h) $\frac{25}{100}, \frac{23}{90}, \frac{21}{80}, \frac{19}{70}, \frac{17}{60}, \dots\dots$
 i) $\frac{55}{20}, \frac{50}{16}, \frac{45}{12}, \frac{40}{8}, \frac{35}{4}, \dots\dots$ j) $\frac{10}{50}, \frac{30}{45}, \frac{50}{40}, \frac{70}{35}, \frac{90}{30}, \dots\dots$
- 4) **a) 1, 4, 9, 16, 25,** b) 2, 8, 18, 32, 50, c) 4, 16, 36, 64, 100,
 d) 2, 5, 10, 17, 26, e) 5, 8, 13, 20, 29, f) 3, 12, 27, 48, 75,
 g) 10, 40, 90, 160, 250, h) 11, 14, 19, 26, 35, i) 5, 20, 45, 80, 125,
 j) 0, 3, 8, 15, 24, k) -1, -4, -9, -16, -25, ... l) 101, 104, 109, 116, 125,
- 5) **a) 1, 4, 9, 16, 25, 36, 49, 64, 81, 100,** b) 4, 9, 16, 25, 36,
 c) 9, 16, 25, 36, 49, d) 0, 1, 4, 9, 16, e) 25, 36, 49, 64, 81,
 f) 4, 1, 0, 1, 4, 9, g) 81, 64, 49, 36, 25, h) 36, 25, 16, 9, 4,

ANSWERS.

- 1) a) $3n - 1$, b) $n + 1$, c) $5n - 1$, d) $2n + 5$, e) $5n - 7$, f) $2n - 2$, g) n , h) $3n$, i) $6n - 5$,
j) $4n + 4$, k) $4n - 8$, l) $10n + 10$.
- 2) a) $33 - 3n$, b) $27 - 2n$, c) $17 - n$, d) $110 - 10n$, e) $60 - 5n$, f) $13 - 3n$, g) $26 - 5n$,
h) $6 - n$, i) $44 - 4n$, j) $2 - n$, k) $350 - 50n$, l) $-n$.
- 3) a) $\frac{2n - 1}{3n - 1}$, b) $\frac{3n}{2n + 3}$, c) $\frac{4n - 3}{5n + 1}$, d) $\frac{n + 9}{2n}$, e) $\frac{10n - 5}{4n + 2}$, f) $\frac{3n + 1}{n + 4}$, g) $\frac{33 - 3n}{4n - 2}$,
h) $\frac{27 - 2n}{110 - 10n}$, i) $\frac{60 - 5n}{24 - 4n}$, j) $\frac{20n - 10}{55 - 5n}$.
- 4) a) n^2 , b) $2n^2$, c) $4n^2$, d) $n^2 + 1$, e) $n^2 + 4$, f) $3n^2$, g) $10n^2$, h) $n^2 + 10$, i) $5n^2$,
j) $n^2 - 1$, k) $-n^2$, l) $100 + n^2$.
- 5) a) n^2 , b) $(n + 1)^2$, c) $(n + 2)^2$, d) $(n - 1)^2$, e) $(n + 4)^2$, f) $(n - 3)^2$, g) $(10 - n)^2$,
h) $(7 - n)^2$.