

Problems with Quadratic Sequences

(a) A quadratic sequence has n th term $n^2 + 13$. Is 302 a term of the sequence? Explain how you know.

(b) A quadratic sequence has n th term $2n^2 + 3n - 1$. Is 116 a term of the sequence? Explain how you know.

$$(a) \quad n^2 + 13 = 302$$

$$n = 17$$

Yes, 302 is the 17th term

$$(b) \quad 2n^2 + 3n - 1 = 116$$

$$n = 6.93$$

No, 116 is not in the sequence

(a) A quadratic sequence has n th term $n^2 + 4n - 5$. Given that 187 is a term in the sequence, find the position of this term.

$$(a) \quad n^2 + 4n - 5 = 187$$

$$n^2 + 4n - 192 = 0$$

$$n = 12$$

(b) A quadratic sequence has n th term $\frac{1}{2}n^2 - 3n$. Given that $\frac{391}{2}$ is a term in the sequence, find the position of this term.

$$(b) \quad \frac{1}{2}n^2 - 3n = \frac{391}{2}$$

$$n^2 - 6n - 391 = 0$$

$$n = 23$$

(a) A quadratic sequence has n th term $an^2 + b$. The third term of the sequence is 16 and the 5th term of the sequence is 64. Find the values of a and b .

$$(a) \quad \begin{cases} 9a + b = 16 \\ 25a + b = 64 \end{cases} \quad a = 3, b = -11$$

(b) A quadratic sequence has n th term $n^2 + cn + d$. The second term of the sequence is 6 and the 10th term of the sequence is 78. Find the values of c and d .

$$(b) \quad \begin{cases} 4 + 2c + d = 6 \\ 100 + 10c + d = 78 \end{cases}$$

$$c = -3, d = 8$$

(a) Find the n th term of the sequence whose first four terms are

$$\frac{5}{2}, \quad \frac{7}{5}, \quad \frac{9}{10}, \quad \frac{11}{17}$$

(b) Find the n th term of the sequence whose first four terms are

$$\frac{1}{3}, \quad \frac{4}{7}, \quad \frac{9}{13}, \quad \frac{16}{21}$$

$$(a) \quad \frac{2n+3}{n^2+1}$$

$$(b) \quad \frac{n^2}{n^2+n+1}$$

(a) The first three terms of a quadratic sequence are the first three prime numbers. Find the n th term of this quadratic sequence.

$$(a) \quad 2, 3, 5$$

$$\frac{1}{2}n^2 - \frac{1}{2}n + 2$$

(b) A quadratic sequence starts
8, 12, 12, 8, ...

$$(b) \quad 10n - 2n^2$$

$$-352$$

Find the n th term of this sequence and hence the first term in the sequence that is less than -300 .