

## Limit of a Sequence

Find the limits of these sequences as  $n \rightarrow \infty$

(a)  $\frac{3n}{9n-4}$

(b)  $\frac{n}{2n-7}$

(c)  $\frac{4n}{2n+1}$

(d)  $\frac{8n+1}{2n-3}$

(e)  $\frac{3n+2}{6n-4}$

(f)  $\frac{2-9n}{15n-4}$

(a)  $\frac{1}{3}$       (b)  $\frac{1}{2}$

(c) 2      (d) 4

(e)  $\frac{1}{2}$       (f)  $-\frac{3}{5}$

Find the limits of these sequences as  $n \rightarrow \infty$

(a)  $\frac{n^2}{n^2-1}$

(b)  $\frac{4n^2}{n^2+1}$

(c)  $\frac{5n^2+1}{10n^2-2}$

(d)  $\frac{2n^2-1}{5n^2}$

(a) 1      (b) 4

(c)  $\frac{1}{2}$       (d)  $\frac{2}{5}$

(a) A sequence starts  $\frac{2}{3}, \frac{3}{5}, \frac{4}{7}, \frac{5}{9}, \dots$

Find the  $n$ th term for this sequence and the limiting value as  $n \rightarrow \infty$ .

(b) A sequence starts  $\frac{1}{5}, \frac{4}{9}, \frac{7}{13}, \frac{10}{17}, \dots$

Find the  $n$ th term for this sequence and the limiting value as  $n \rightarrow \infty$ .

(a)  $\frac{n+1}{2n+1} \rightarrow \frac{1}{2}$

(b)  $\frac{3n-2}{4n+1} \rightarrow \frac{3}{4}$

(a) A sequence with  $n$ th term  $\frac{an+5}{5n-1}$  has a limiting value of  $\frac{2}{5}$  as  $n \rightarrow \infty$ . Work out the value of  $a$ .

(b) A sequence with  $n$ th term  $\frac{10-bn}{3n+2}$  has a limiting value of  $-3$  as  $n \rightarrow \infty$ . Work out the value of  $b$ .

(a)  $a = 2$

(b)  $b = 9$