Name

SHOW AS MUCH WORK AS POSSIBLE BECAUSE YOU MAY RECEIVE PARTIAL CREDIT FOR THE WORK YOU DO IF YOUR ANSWER IS INCORRECT.

1. For each of the following sequences, calculate the first 4 terms (exactly, not a decimal approximation) and find the limit if it exists (exactly, not a decimal approximation) or write DNE if the limit does not exist.

a. $a_n = \frac{1-n^2}{3n^2-2}$

$$\boxed{\lim_{x\to\infty}\frac{1-n^2}{3n^2-2} = \lim_{x\to\infty}\frac{\frac{1}{n^2}-1}{3-\frac{2}{n^2}} = \frac{0-1}{3-0} = -\frac{1}{3}}$$

n	1	2	3	4	∞
a_n	0	$-\frac{3}{10}$	$-\frac{8}{25}$	$-\frac{15}{46}$	$-\frac{1}{3}$

b. $b_n = (-1)^n\left(\frac{1}{2}\right)^n$

$$\boxed{\left|(-1)^n\left(\tfrac{1}{2}\right)^n\right| \le \left(\tfrac{1}{2}\right)^n \Rightarrow \lim_{x\to\infty}(-1)^n\left(\tfrac{1}{2}\right)^n = \lim_{x\to\infty}\left(\tfrac{1}{2}\right)^n = 0}$$

n	1	2	3	4	∞
b_n	$-\frac{1}{2}$	$\frac{1}{4}$	$-\frac{1}{8}$	$\frac{1}{16}$	0

c. $c_n = \sqrt{\frac{2n}{n+1}}$

$$\boxed{\lim_{x\to\infty}\sqrt{\frac{2n}{n+1}} = \sqrt{\lim_{x\to\infty}\frac{2n}{n+1}} = \sqrt{\lim_{x\to\infty}\frac{2}{1+\frac{1}{n}}} = \sqrt{\frac{2}{1+0}} = \sqrt{2}}$$

n	1	2	3	4	∞
c_n	$\sqrt{\frac{2}{2}} = 1$	$\sqrt{\frac{4}{3}} = \frac{2\sqrt{3}}{3}$	$\sqrt{\frac{6}{4}} = \frac{\sqrt{6}}{2}$	$\sqrt{\frac{8}{5}} = \frac{2\sqrt{10}}{5}$	$\sqrt{2}$