**Lecture 5**

1. For the given sequences

* determine the first three terms
* determine the minimum, maximum, infimum and supremum
* decide the boundedness of the sequence
* sketch the graph of the first three terms

a) $a\_{n}=\frac{-3n}{n+1}$ b) $a\_{n}=2n+1$

2. Calculate the following limits:

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| a) | $$\lim\_{n\to \infty }\frac{3n-1}{n+4}$$ |
| b) | $$\lim\_{n\to \infty }\frac{2n+5}{4n+8}$$ |
| c) | $$\lim\_{n\to \infty }\frac{n-2}{n^{2}+6}$$ |
| d) | $$\lim\_{n\to \infty }\frac{n^{3}-10n^{2}-4}{5n^{2}+100}$$ |
| e) | $$\lim\_{n\to \infty }\left(\sqrt{n+2}-\sqrt{n}\right)$$ |
| f) | $$\lim\_{n\to \infty }\left(n-\sqrt{n^{2}+5n}\right)$$ |
| g) | $$\lim\_{n\to \infty }\left(2n-\sqrt{2n^{2}+4n}\right)$$ |
| h) | $$\lim\_{n\to \infty }\left(\sqrt{n}\left(\sqrt{n+1}-\sqrt{n}\right)\right)$$ |
| i) | $$\lim\_{n\to \infty }\frac{4^{n-1}-5}{2^{2n}+1}$$ |
| j) | $$\lim\_{n\to \infty }\frac{2^{n+1}+3^{n+2}}{3^{n+3}}$$ |
| k) | $$\lim\_{n\to \infty }\frac{3^{2n+1}-2^{n-1}}{5^{n}+1}$$ |
| l) | $$\lim\_{n\to \infty }\frac{2^{2n-1}+3^{n+1}}{5^{n-1}-1}$$ |
| m) | $$\lim\_{n\to \infty }\left(1+\frac{1}{n}\right)^{n}=e$$ |

3. Determine whether the given geometric series is convergent and, if so, determine its sum.

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| a) | $$\sum\_{n=1}^{\infty }\left(-\frac{1}{3}\right)^{n}$$ |
| b) | $$\sum\_{n=1}^{\infty }\left(\frac{11}{10}\right)^{n}$$ |