

Elementary Mathematics 6101

Exercise Sheet 5

5 November 2010

Please answer all the questions on the sheet

1. Find the limits of the following sequences if they exist as $n \rightarrow \infty$ by use of the algebra of limits:

a) $a_n = \frac{1}{1+n^2}$

b) $b_n = n$

c) $c_n = \frac{1+2n}{n^2-\sqrt{2}}$

d) $d_n = \left(1 + \frac{1}{n}\right)^{\frac{n}{2}}$

2. Compute the limits of the following functions:

a) $\lim_{x \rightarrow 1} \frac{2x}{x+1}$

b) $\lim_{x \rightarrow -2} \frac{x+2}{x-4}$

c) $\lim_{x \rightarrow -1} \frac{3x^2+x-2}{x+1}$

3. By computing the left and right limits find the value for a for which the function is continuous at $x = 1$.

$$f(x) = \begin{cases} x^2 - 2ax + 2 & x \geq 1 \\ x^3 - 2x & x < 1 \end{cases}$$