Math 181 Honors Homework 4 Worksheet Version A

1. Find the domain for each function. In otherwords, given a function f defined by a formula, find all values $x \in \mathbf{R}$ such that the formula makes sense and $f(x) \in \mathbf{R}$.

   (i) $f(x) = \dfrac{1}{\sqrt{x^2 - 3x - 5}}$

   (ii) $g(x) = \left(\dfrac{1}{2 + \sin x}\right)^2$

   (iii) $h(x) = \dfrac{x}{x}$

2. Convert the repeating decimals to fractions.

   (i) $3.4\overline{5}$

   (ii) $0.0\overline{63}$

   (iii) $19.\overline{9}$

3. Convert the continued fractions to the form $\dfrac{a + \sqrt{b}}{c}$ where a, b and c are integers.

   (i) $[1, 2, 3]$

   (ii) $[1, \overline{1, 2}]$

   (iii) $[2, \overline{3}]$

4. Use the ϵ-δ definition of limit to verify the limits.

   (i) $\lim\limits_{x \to 2} 3x = 6$

   (ii) $\lim\limits_{x \to 3} \dfrac{1}{2 + x} = \dfrac{1}{5}$

   (iii) $\lim\limits_{x \to 5} \sqrt{4 + x} = 3$

5. Suppose $\lim\limits_{x \to 2} f(x) = 5$. Use the ϵ-δ definition of limit to verify $\lim\limits_{x \to 2} x f(x) = 10$.