

HOMEWORK 15

For problems 1 – 3 use an ϵ - δ proof.

- 1) Prove $f(x) = \frac{7}{4}x - 8$ is continuous at $x_0 = 1$ and $x_0 = -1$.
- 2) Prove $g(x) = 3x^3 + 2$ is continuous at $x_0 = 2$.
- 3) Let $f(x) = \frac{x^2 - 2x + 1}{x^2 - 1}$. Notice that $f(1)$ is not defined. Define $f(1)$ so that the function f is continuous at one. Prove f is continuous at $x_0 = 1$.
- 4) True or false? Justify your answer.
 - a) If f and g are continuous on \mathbb{R} with $f(x) > g(x)$ for all $x \in \mathbb{R}^+$, then $f(0) > g(0)$.
 - b) If $f + g$ and fg are continuous, then f and g are continuous.
 - c) If $|f|$ is continuous, then f is continuous.
- 5) Using sequential continuity (section 3.1) Prove: If $f(x) = 0$ for all $x \in \mathbb{Q}$ and $f(x) = 1$ for all $x \in \mathbb{I}$, then f is discontinuous at every real number.