ONE-SIDED AND TWO-SIDED LIMIT PROBLEMS

1. Evaluate the one-sided limits below:

a) i) $\lim_{x \to 2^-} |x-2|$ ii) $\lim_{x \to 2^+} |x-2|$

b) i) $\lim_{x \to -1^-} \sqrt{x^2-1}$ ii) Why do we not evaluate $\lim_{x \to -1^+} \sqrt{x^2-1}$?

c) i) $\lim_{x \to 1^-} \sqrt[3]{\dfrac{x^3 - 4x^2 + 3x}{x^2 - 2x + 2}}$ ii) $\lim_{x \to 1^+} \sqrt[3]{\dfrac{x^3 - 4x^2 + 3x}{x^2 - 2x + 2}}$

2. Compute the following limits:

a) $\lim_{x \to 2} (|x-2| + x)^5$

b) $\lim_{x \to 3} \dfrac{x^2 - 9}{x^2 - 8x + 15}$

c) $\lim_{x \to 0} \frac{\sqrt{x+1}-1}{x}$

d)$\lim_{x \to 1} \frac{x-1}{\sqrt{2x-1}-1}$

3. Find the values of the parameters a and b such that the function

$$f(x) = \begin{cases} (2x+a)^3, & \text{if } x < 0 \\ 5bx + 8, & \text{if } x \leq 0 < 1 \\ x^2 + 12, & \text{if } x > 1 \end{cases}$$

is continuous at all the points in its domain.