

Name _____ No calculators. Present neatly. Score _____.

1.

Let $g(x) = \frac{x^2 + x - 6}{|x - 2|}$.

(a) Find

(i) $\lim_{x \rightarrow 2^+} g(x)$ (ii) $\lim_{x \rightarrow 2^-} g(x)$

(b) Does $\lim_{x \rightarrow 2} g(x)$ exist?

(c) Sketch the graph of g .

2.

Show by means of an example that $\lim_{x \rightarrow a} [f(x) + g(x)]$ may exist even though neither $\lim_{x \rightarrow a} f(x)$ nor $\lim_{x \rightarrow a} g(x)$ exists.

3.

Evaluate $\lim_{x \rightarrow 2} \frac{\sqrt{6-x} - 2}{\sqrt{3-x} - 1}$.

Your work:

Name _____ No calculators. Present neatly. Score _____.

1.

Let

$$g(x) = \begin{cases} x & \text{if } x < 1 \\ 3 & \text{if } x = 1 \\ 2 - x^2 & \text{if } 1 < x \leq 2 \\ x - 3 & \text{if } x > 2 \end{cases}$$

(a) Evaluate each of the following, if it exists.

(i) $\lim_{x \rightarrow 1^-} g(x)$ (ii) $\lim_{x \rightarrow 1} g(x)$ (iii) $g(1)$

(iv) $\lim_{x \rightarrow 2^-} g(x)$ (v) $\lim_{x \rightarrow 2^+} g(x)$ (vi) $\lim_{x \rightarrow 2} g(x)$

(b) Sketch the graph of g .

2.

Show by means of an example that $\lim_{x \rightarrow a} [f(x)g(x)]$ may exist even though neither $\lim_{x \rightarrow a} f(x)$ nor $\lim_{x \rightarrow a} g(x)$ exists.

3.

Is there a number a such that

$$\lim_{x \rightarrow -2} \frac{3x^2 + ax + a + 3}{x^2 + x - 2}$$

exists? If so, find the value of a and the value of the limit.

Your work: