

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Consider the function $f(x) = \begin{cases} x + 1, & \text{if } x \leq 2 \\ -\frac{1}{2}x + 2, & \text{if } x > 2 \end{cases}$.

(a) Sketch the graph of $y = f(x)$ labeling all important points.

(b) Using the graph, find the following:

$$f(2) =$$

$$\lim_{x \rightarrow 2^-} f(x) =$$

$$\lim_{x \rightarrow 2^+} f(x) =$$

$$\lim_{x \rightarrow 2} f(x) =$$

2. Compute the difference quotient of $f(x) = \sqrt{3-x}$ at $x = -1$ (make sure to simplify).

3. Compute the following limits:

(a) $\lim_{x \rightarrow 2} \frac{x^2 + 2x - 8}{x^2 - x - 2} =$

(b) $\lim_{x \rightarrow -3} \frac{\frac{1}{x} + \frac{1}{3}}{x + 3} =$