

- **Show all relevant supporting work** to receive full credit in problems 2 and 3.

Incorrect answers with substantially correct work may receive partial credit.

Unsubstantiated answers will receive no credit.

Using a table of values or L'Hôpital's rule is **not considered valid support** for computing limits.

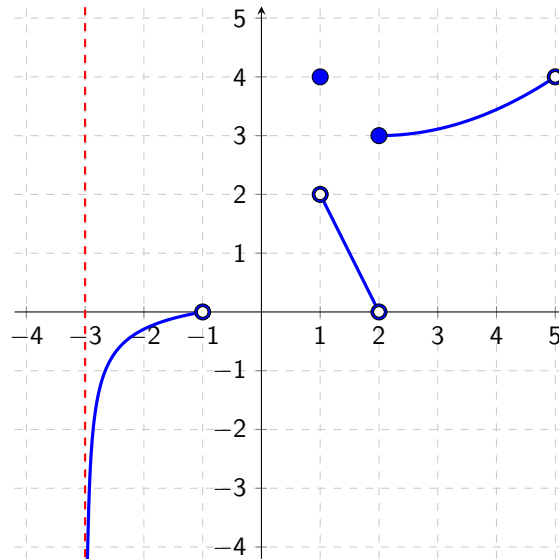
Using graphs not given in this assessment is **not considered valid support** for computing limits.

- Give **exact** answers unless instructed to do otherwise.

Intervals should be expressed **simplified in interval notation**.

If a requested value does not exist, write "DNE." Write that limits "DNE" only if they do not exist and are not ∞ or $-\infty$.

1) A function f has graph given in the figure below.



a) Evaluate the following limits. Write only your final answer on the blank.

i) (1 point) $\lim_{x \rightarrow 2^-} f(x)$: _____

iii) (1 point) $\lim_{x \rightarrow 2} f(x)$: _____

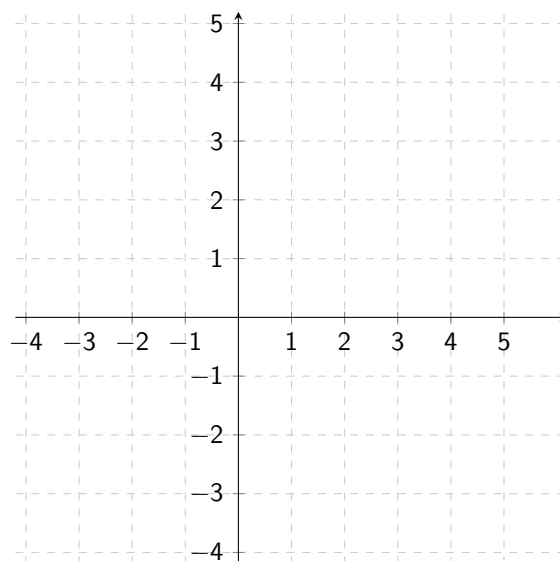
ii) (2 points) $\lim_{x \rightarrow 1^+} \cos\left(\frac{\pi}{2} f(x)\right)$: _____

iv) (2 points) $\lim_{x \rightarrow 5^-} \frac{f(x)}{5-x}$: _____

b) (3 points) Find the **Intervals of continuity** of f .

Intervals of continuity: _____

c) (4 points) On the axes below, plot the graph of f^{-1} .



2) a) (8 points) Let $h(t) = \sqrt{t+3}$. Find the form of the following limit and evaluate it.

$$\lim_{t \rightarrow 3^-} \frac{h(1+t) - h(4)}{t-3}$$

FORM : _____

VALUE : _____

b) (7 points) Find the form of the following limit and evaluate it.

$$\lim_{x \rightarrow 2} \frac{(x+3)^2 - 25}{x(x+1) - 6}$$

FORM : _____

VALUE : _____

c) (7 points) Let $f(x) = \sin(x)$. Evaluate the limit: $\lim_{x \rightarrow \infty} \frac{f(\sqrt{x})}{x^2}$.

VALUE : _____

3) Let g be a piecewise-defined function given by:

$$g(x) = \begin{cases} \frac{4x - \sqrt{x^2 + 11}}{2x - 6}, & \text{if } x \leq 5 \text{ and } x \neq 3 \\ \ln(x - 5), & \text{if } x > 5 \end{cases}$$

a) Evaluate the following limits.

i) (7 points) $\lim_{x \rightarrow -\infty} g(x)$

$$\lim_{x \rightarrow -\infty} g(x) = \underline{\hspace{2cm}}$$

ii) (3 points) $\lim_{x \rightarrow \infty} g(x)$

$$\lim_{x \rightarrow \infty} g(x) = \underline{\hspace{2cm}}$$

iii) (4 points) $\lim_{x \rightarrow 3^+} g(x)$

$$\lim_{x \rightarrow 3^-} g(x) = \underline{\hspace{2cm}}$$

iv) (3 points) $\lim_{x \rightarrow 5^+} g(x)$

$$\lim_{x \rightarrow 5^+} g(x) = \underline{\hspace{2cm}}$$

b) (4 points) Let g be the function on the previous page. Find the **vertical asymptotes** of g . Justify your answer by citing appropriate limits. Explain how you know that there are no others.

c) (4 points) Let g be the function on the previous page. Find the **horizontal asymptotes** of g . Justify your answer by citing appropriate limits. Explain how you know that there are no others.