Instructions: Please show all of your work as partial credit will be given where appropriate, and there may be no credit given for problems where there is no work shown. All answers should be completely simplified, unless otherwise stated. No calculators or electronics of any kind are allowed. (Total of 50 points possible.)

1. (15 points) Evaluate the following limits

   (a) (5 points) \( \lim_{x \to 0} \frac{x^2 - 2x + 2}{2x^3 + 5x + 1} \)

      Answer: ________________

   (b) (5 points) \( \lim_{x \to -2} \frac{x^3 + 8}{x^2 - 2x + 4} \)

      Answer: ________________

   (c) (5 points) \( \lim_{x \to 4} \frac{x^2 - 16}{\sqrt{x} - 2} \)

      Answer: ________________
2. (15 points) Evaluate each limit.
   
   (a) (5 points) \( \lim_{\theta \to \pi/2} \theta \cos \theta \)

   Answer: ______________________

   (b) (5 points) \( \lim_{\theta \to 0} \frac{1 - \cos^2 \theta}{\theta^2} \)

   Answer: ______________________

   (c) (5 points) \( \lim_{t \to 0} \frac{\sin^2 (3t)}{4t^2} \)

   Answer: ______________________
3. (8 points) For this graph of $y = f(x)$, answer the following questions. Write DNE if the limit or function value does not exist.

(a) $\lim_{x \to 0} f(x) =$

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

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

(d) $\lim_{x \to 2} f(x) =$

(e) $f(2) =$

(f) $f(0) =$

(g) $f(\pi) =$
4. (12 points) Define a piecewise function (algebraically) whose domain is all real numbers and that has the following properties. Also, draw its graph on the $xy$-plane below.

(a) $\lim_{x \to 1^+} f(x) = 3$

(b) $\lim_{x \to 1^-} f(x) = 5$

(c) $\lim_{x \to -2} f(x) = 2$

(d) $f(-2) = -1$

Function definition: ________________________________

\begin{center}
\includegraphics[width=\textwidth]{graph.png}
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