Provide both a clear and organized presentation. Completely answer each question, give exact values only, and show all of your work. Only a scientific calculator can be used on this exam. If any derivative is to be computed, use our definition of the derivative (i.e., the limit of a difference quotient), not any differentiation shortcuts.

1. ( 16 pts) Consider the graph of $y=f(x)$ provided below:


Using the graph of $y=f(x)$ provided above, evaluate each of the following if they exist or are defined. Otherwise, state such.
i) $\quad \lim _{x \rightarrow-2} f(x)$
ii) $\quad \lim _{x \rightarrow+^{+}} f(x)$
iii) $\quad \lim _{x \rightarrow 1} f(x)$
iv) $\quad \lim _{x \rightarrow 3^{+}} f(x)$
v) $\quad \lim _{x \rightarrow \infty} f(x)$
vi) $\quad f(1)$
2. ( 12 pts ) Determine the domain of $f$ in interval notation if:

$$
f(x)=\frac{\sqrt{12 x^{3}-8 x^{2}-x+1}}{x+\pi}
$$

3. (16 pts) If $f(x)=\frac{x^{2}}{2-x}$, find $f^{\prime}(x)$
4. (8 pts) Let $f(x)=\left\{\begin{array}{cl}\frac{7 x}{2 x^{2}-c} & \text { if } x \geq 2 \\ c x & \text { if } x<2\end{array}\right.$ and determine all values of $c$ that will allow $f$ to be continuous over $(-\infty, \infty)$
5. (8 pts) Evaluate each of the following limits:
i) $\quad \lim _{x \rightarrow 2} \frac{|x-2|}{x^{3}-2 x^{2}}$
ii) $\quad \lim _{x \rightarrow 2} \frac{x^{2}-5}{(x-2)^{2}}$
6. (32 pts) Evaluate each of the following limits:
i) $\quad \lim _{x \rightarrow 2} \frac{x^{2}-4}{\sqrt{x}-\sqrt{2}}$
ii) $\quad \lim _{x \rightarrow 2} \frac{x-2}{2 x^{3}-3 x^{2}-8 x+12}$
iii) $\lim _{x \rightarrow 0} \frac{\sqrt{x^{2}+3 x+3}-\sqrt{x^{2}+x+3}}{x}$
iv) $\lim _{x \rightarrow-\infty} \frac{2 x+\sqrt{5 x^{2}+1}}{3 x}$
7. (8 pts) Use our epsilon-delta definition of the limit to prove that:

$$
\lim _{x \rightarrow 2}\left(5 x^{2}-3 x+1\right)=15
$$

