1. Find \( \lim_{{x \to 3}} \frac{x^2 - 9}{x - 3} \).

\[
= \lim_{{x \to 3}} \frac{(x-3)(x+3)}{x-3} = \lim_{{x \to 3}} (x+3) = 6
\]

2. Find \( \lim_{{x \to 2^-}} \frac{\sqrt{8-x^3}}{x^2-4} \).

\[
= \lim_{{x \to 2^-}} \frac{\sqrt{8-x^3}}{(x-2)(x+2)} = \lim_{{x \to 2^-}} \frac{\sqrt{-1} \cdot (x^2 + 2x + 4)}{x+2} \\
= 3 \sqrt{-\frac{4+4+4}{4}} = -\frac{3}{2}
\]

3. Find a \( a \) so that \( f(x) \) is continuous for all \( x \), where

\[
f(x) = \begin{cases} 
  x^2 + 3ax + 2, & x \leq 2 \\
  x^3 + a, & x > 2.
\end{cases}
\]

\[
\lim_{{x \to 2^-}} f(x) = \lim_{{x \to 2^-}} (x^2 + 3ax + 2) = 4 + 6a + 2 = 6 + 6a \\
\lim_{{x \to 2^+}} f(x) = \lim_{{x \to 2^+}} (x^3 + a) = 8 + a
\]

Also, \( f(2) = 6 + 6a \). So must have \( 6 + 6a = 8 + a \)

\[
a = 2/5
\]

4. \( \lim_{{x \to \infty}} \frac{3x^3 + x^4 - 8x^2 + 10000}{1 + x^4} \).

\[
= \lim_{{x \to \infty}} \frac{x^4}{x^4} = 1
\]

(As \( x \to \infty \), all other terms (besides the \( x^4 \)'s) become negligible.)