This is not an exhaustive review. In otherwords, this does NOT cover everything in Chapter 1 and there may be more (or less) of these concepts on your Unit I Exam.

1. Use the graph of $f(x)$ below to determine the requested values.

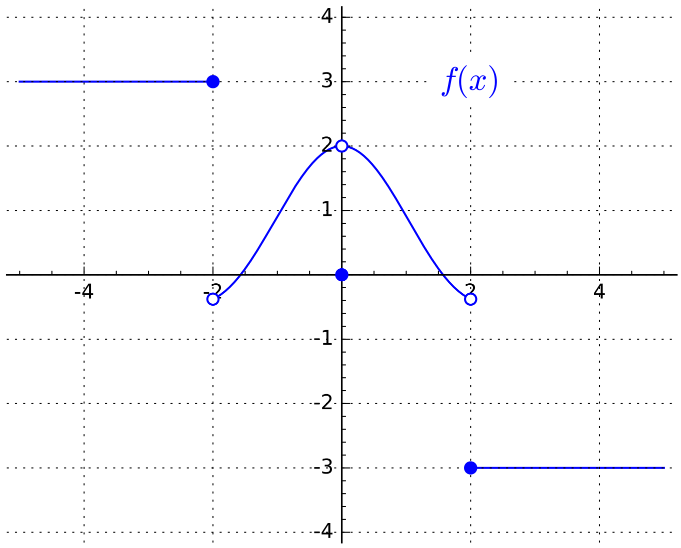

Figure 1: Graph of $f(x)$

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

(b) $\lim_{x \to 0^-} f(x) =$ ______

(c) $\lim_{x \to 0^+} f(x) =$ ______

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

(e) $\lim_{x \to -\infty} f(x) =$ ______

(f) $\lim_{x \to \infty} f(x) =$ ______

(g) $f(-2) =$ ______

(h) $f(0) =$ ______

(i) $f(2) =$ ______

(j) Does $f(x)$ have left-continuity, right-continuity, neither or both at $x = -2$?

(j) ____________

(k) Does $f(x)$ have left-continuity, right-continuity, neither or both at $x = 0$?

(k) ____________

(l) Does $f(x)$ have left-continuity, right-continuity, neither or both at $x = 2$?

(l) ____________

(m) Complete the table by indicating the x-values for which $f(x)$ is discontinuous and identifying what type of discontinuity it has at that x-value.

x-value			
Discontinuity			

2. Write the following limits using the interval notation definition from Section 1.2 and the absolute value notation from Section 1.3.

(a) $\lim_{x \to 1} \left(2x^2 - 4x + 3\right) = 1$

(b) $\lim_{x \to 5^+} \left(\sqrt{x - 5}\right) = 0$

(c) $\lim_{x \to 5^+} \left(\sqrt{x - 5}\right) = 0$

(d) $\lim_{x \to 8} (3x - 11) = 13$

3. Use an epsilon-delta proof to show that the following limits are true for any given ε.

(a) $\lim_{x \to 8} (3x - 11) = 13$

(b) $\lim_{x \to -3} (1 - x) = 4$

(c) $\lim_{x \to -3} \frac{x^2 - 9}{x + 3} = -6$

4. For each of the following situations, draw a graph that meets the requirements. In each case, there are many possible answers.

   (a) Draw $f(x)$ where $\lim_{x \to -5} f(x) = -2$, $f(-5) = 1$, and $\lim_{x \to \infty} f(x) = 4$.

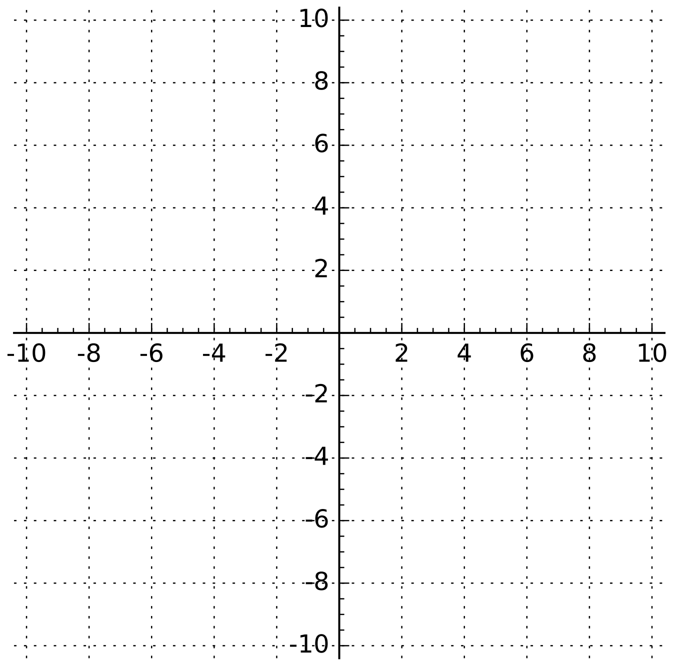

Figure 2: Graph of $f(x)$

(b) Draw $g(x)$ where $\lim_{x \to -2^+} g(x) = -\infty$, $\lim_{x \to -2^-} g(x) = \infty$, $\lim_{x \to \infty} g(x) = 0$, and $g(x)$ has a damped oscillation as x goes to infinity.

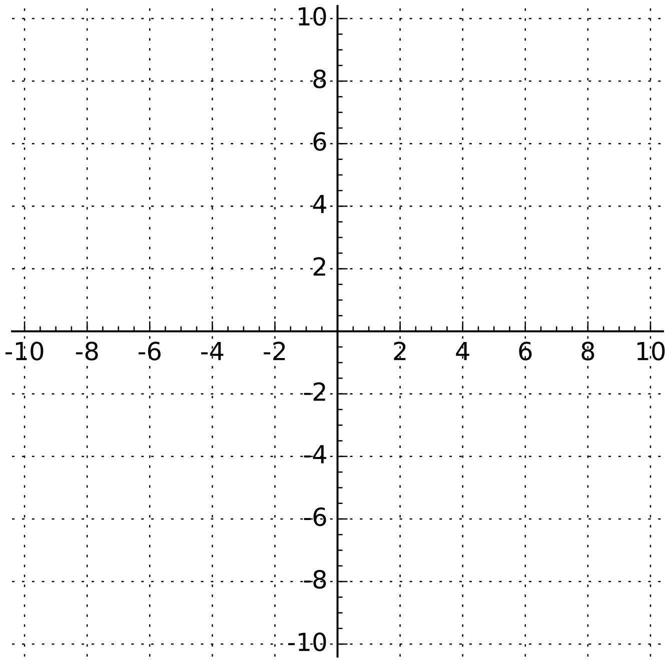

Figure 3: Graph of $g(x)$

(c) Draw $h(x)$ where $\lim_{x \to 2^+} h(x) = -1$, $\lim_{x \to 2^-} h(x) = 1$, and $h(2) = 4$.

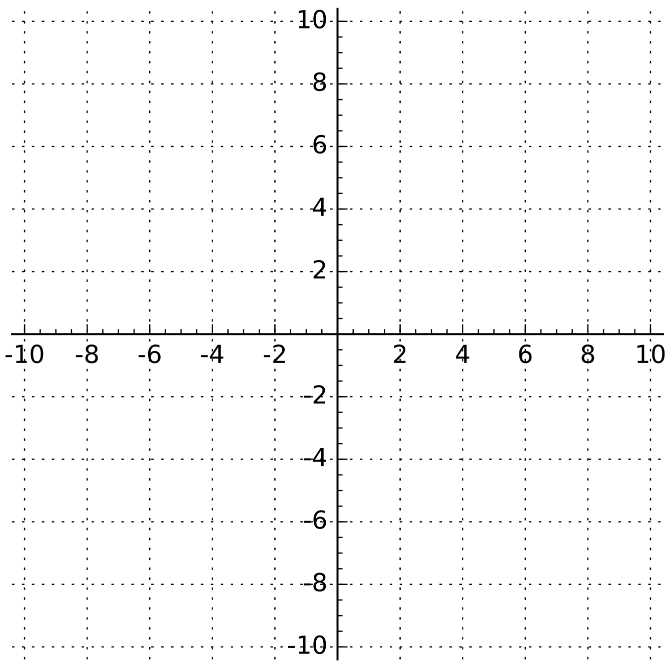

Figure 4: Graph of $h(x)$

5. Calculate the requested limits.

(a) $\lim_{x \to 0} \dfrac{x^2 - 4x + 4}{x^3 + 5x^2 - 14x}$

(b) $\lim_{h \to 0} \dfrac{(h-2)^3 + 8}{h}$

(c) $\lim_{\theta \to 0} \dfrac{\cos(2\theta) - 1}{\sin(\theta)}$

$\big[$Hint: $\cos(2\theta) = 1 - 2\sin^2(\theta)\big)\big]$

(d) $\lim_{x \to 0} (1 + 7x)^{2/x}$

(e) $\lim_{x\to\infty} \left(\ln(5x^2) - \ln(2x^2)\right)$

(f) $\lim_{y\to 0} \frac{\sin(3y)}{5y}$

(g) $\lim_{i\to\infty} \sum_{i=0}^{n} \frac{(-1)^i}{(2i+1)!}$. Use Desmos to estimate the value.