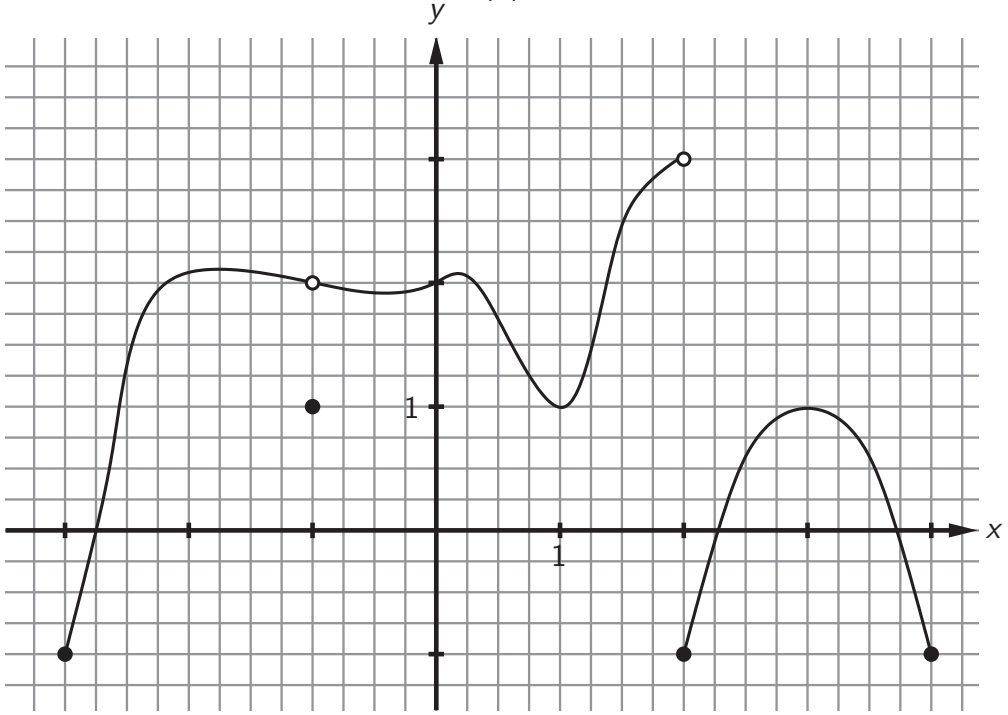
Question 1: For this question use the graph of $y = f(x)$ below:



(a)[2] What is $(f \circ f)(2)$?

(b)[1] State the domain of $f(x)$ using interval notation.

(c)[1] State the range of $f(x)$ using interval notation.

(d)[2] Determine $\lim_{x \to -1} f(x)$.

(e)[2] Determine $\lim_{x \to 2} f(x)$.

(f)[2] What is $\lim_{x \to 2^-} f(x)$?

Question 2: For this question use the functions $f(x) = \dfrac{1}{x-1}$ and $g(x) = \sqrt{x-3}$.

(a)[3] Determine $(f - g)(x)$ and state the domain using interval notation.

(b)[3] Determine $(f \circ g)(x)$ and state the domain using interval notation.

(c)[4] Compute and simplify the difference quotient $\dfrac{f(x+h) - f(x)}{h}$.

Question 3: Evaluate the following limits, if they exist:

(a)[3] $\lim_{x\to 3} \dfrac{x^2+4x-21}{x^2-x-6}$

(b)[3] $\lim_{x\to 5^-} \dfrac{x-\sqrt{5-x}}{5+x}$

(c)[4] $\lim_{x\to 2^-} \left(\dfrac{1}{x-2}+\dfrac{1}{|x-2|}\right)$

Question 4: Evaluate the following limits, if they exist:

(a)[5] $\lim_{x \to 4} \dfrac{4 - \sqrt{12 + x}}{x - 4}$

(b)[5] $\lim_{x \to -6} \dfrac{\left[\dfrac{1}{6} + \dfrac{1}{x}\right]}{6 + x}$

Question 5:

(a)[3] Evaluate the following limit if it exists: $\lim_{x\to 0} \dfrac{\sin(2x)}{\sin(7x)\cos(3x)}$

(b)[3] Evaluate the following limit if it exists: $\lim_{\theta\to 0} \dfrac{\sin(2\theta)}{4\theta^2}$

(c)[4] Suppose $g(x)$ is a function with the property that $-2 \leq g(x) \leq 3$ for every real number x. Determine $\lim_{x\to 0} x^4 g(x)$. (State any theorems used, like the the Squeeze Theorem, for example, and be sure to state the conditions necessary to justify use of the theorem.)