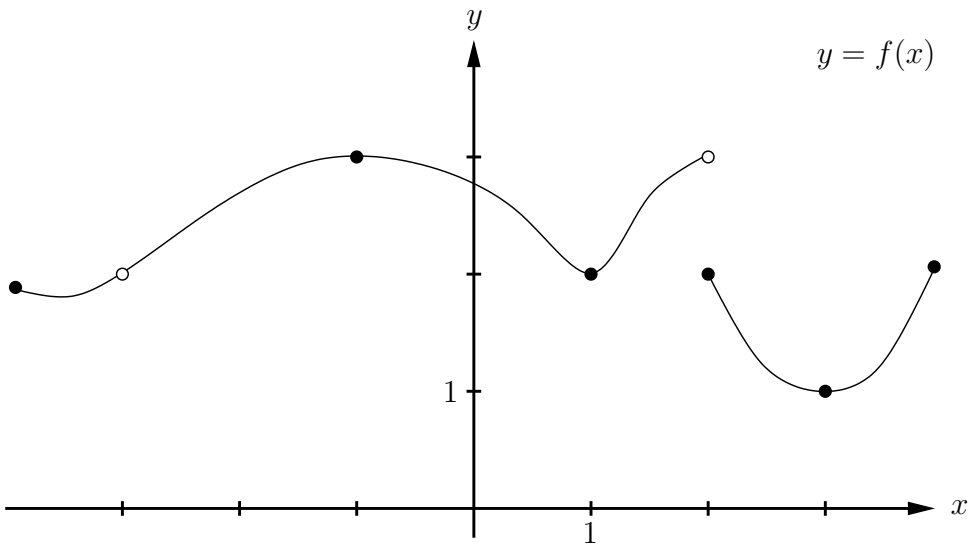
Question 1: For this question use the graph of $y = f(x)$ below:



(a)[2 points] What is the range of $f(x)$?

(b)[2 points] What is $(f \circ f)(-1)$?

(c)[2 points] What is $\lim_{x \to -3} f(x)$?

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

(e)[2 points] Is f continuous at $x = -3$? Explain your answer using limits.

Question 2:

(a)[5 points] Evaluate: $\lim_{x \to -5} \dfrac{x^2 + 3x - 10}{x^2 + 8x + 15}$

(b)[3 points] Evaluate: $\lim_{x \to \pi} \dfrac{3x^3 - 2\sin^2(2x)}{x\cos(x)}$

(c)[2 points] Evaluate: $\lim_{x \to -6} \dfrac{\sqrt{10 + x}}{x^2 - 36}$

Question 3:

(a)[5 points] Evaluate: $\lim_{x\to 2} \dfrac{\sqrt{11-x}-3}{x-2}$

(b)[3 points] Evaluate: $\lim_{x\to -4^+} \dfrac{|x+4|}{3x+12}$

(c)[2 points] Evaluate: $\lim_{x\to \pi} \dfrac{(x-\pi)^2}{\pi x}$

Question 4:

(a)[5 points] Evaluate: $\lim_{\theta \to 0} \dfrac{\sin(2\theta) + \sin(3\theta)}{3\theta + \tan(\theta)}$

(b)[5 points] Evaluate: $\lim_{x \to 0} \left(\dfrac{x^2}{1+x} \right) \cos\left(\dfrac{1}{x} \right)$ using the Squeeze Theorem. Carefully show all steps to support your argument.

Question 5:

(a)[4 points] Let $f(x) = \dfrac{1}{1-x}$ and $g(x) = \dfrac{1+x}{x}$. Determine and simplify $(f \circ g)(x)$ and determine its domain.

(b)[4 points] Let $H(x) = \left(1 + \sqrt{1 + \sin x}\right)^3$ and $g(x) = \sqrt{1+x}$. Find functions f and h so that $H = f \circ g \circ h$.

(c)[2 points] Give an example of functions $f(x)$ and $g(x)$ such that neither $\lim_{x\to 0} f(x)$ nor $\lim_{x\to 0} g(x)$ exist, yet $\lim_{x\to 0}[f(x) - g(x)]$ does exist.