Question 1:

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

(b)[5 points] Evaluate: $\lim_{x\to 0} x^8 \cos\left(\dfrac{8}{x}\right)$
(the Squeeze Theorem may help here).

Question 2:

(a)[3 points] Recall that a circle of radius r has area $A = \pi r^2$ and circumference $C = 2\pi r$. Express the circumference C as a function of the area A.

(b)[3 points] Let $H(x) = \cot^2(\sqrt{x^2+2})$ and $h(x) = x^2$. Find functions f and g so that $H = f \circ g \circ h$. (There are several possible correct answers.)

(c)[4 points] Let $f(x) = \dfrac{2}{x^2}$ and $g(x) = \dfrac{x}{\sqrt{3-x}}$. Determine, simplify, and find the domain of $(f \circ g)(x)$.

Question 3:

(a)[5 points] Evaluate: $\lim_{x \to \pi} \frac{\sin^2\left(\frac{x}{2}\right)}{x - \pi}$

(b)[5 points] Let $f(x) = \frac{1}{x+3}$. Evaluate and simplify the difference quotient $\frac{f(a+h) - f(a)}{h}$.

Question 4:

(a)[5 points] Evaluate: $\lim_{x \to 36} \dfrac{6 - \sqrt{x}}{x - 36}$

(b)[5 points] Evaluate: $\lim_{x \to -5^-} \dfrac{5x + 25}{|x + 5|}$

Question 5:

(a)[5 points] Evaluate: $\lim_{x\to 3} \dfrac{x^2-3x-3}{\sqrt{x^2+16}-3}$

(b)[5 points] Evaluate: $\lim_{x\to -6} \dfrac{x^2+8x+12}{x^2+5x-6}$