Question 1:

(a)[4] Find all values of x in $[0, 2\pi]$ that satisfy the equation $\sqrt{2}\sin x - 1 = 0$.

(b)[3] Determine the exact value of $\cos(4\pi/3)$.

(c)[3] Determine $\tan\theta$ if $\cos\theta = 2/5$ and $0 < \theta < \pi/2$.

Question 2:
Evaluate the following limits, if they exist:

(a)[3] $\lim_{x\to -1} \dfrac{x^2+4x+3}{x+1}$

(b)[4] $\lim_{x\to 1} \dfrac{x-1}{\sqrt{x+8}-3}$

(c)[3] $\lim_{x\to 0} \dfrac{\sqrt{5x+9}-3}{x-3}$

Question 3: For this question use the functions $f(x) = \sqrt{x+1}$, $g(x) = \dfrac{1}{x^2-5}$, $h(x) = \dfrac{1}{x}$.

(a)[3] Determine $(h \circ g \circ f)(x)$ and simplify.

(b)[3] Determine the domain of $(g \circ f)(x)$.

(c)[2] Find a function $q(x)$ so that $g(x) = (q \circ h)(x)$.

(d)[2] Find a function $p(x)$ so that $g(x) = (h \circ p)(x)$.

Question 4:

(a)[5] Determine $\lim_{x\to 0} x^4 \cos\left(\sqrt{1+x^2}\right)$.

(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.)

(b)[5] Evaluate the following limit if it exists: $\lim_{\theta\to 0} \dfrac{\sin\theta}{\theta + \tan\theta}$

Question 5: Evaluate the following limits, if they exist:

(a)[2] $\lim_{x\to 2} \dfrac{\cos(\pi x)}{(x-2)^2}$

(b)[4] $\lim_{x\to 0^-} \left(\dfrac{1}{x} + \dfrac{1}{|x|}\right)$

(c)[4] $\lim_{x\to 0} \dfrac{\left[\dfrac{1}{x-1} + \dfrac{1}{x+1}\right]}{x}$