1. (13 points; 3,3,3,4) Solve for $x$, simplify (Consider $x$ as a real number and $0 \leq x \leq 2\pi$ for trig functions):
   (a) $-9^2 = 3\sqrt{-8} + x$  
   (b) $x \cdot 8^{\frac{1}{2}} = \sqrt{2}$  
   (c) $\left[\frac{4-3\cdot 2+3+\frac{1}{2}}{\sqrt{\frac{1}{2}}}\right]^2 = x/2$  
   (d) $\sin 2x = \cos x$.

2. (22 points; 3,3,5,4,7) Consider the following functions:
   $f(x) = \frac{|x+1|}{x}$ and $g(x) = \sqrt{(x^2 - 1)}$ and $h(x) = \begin{cases} 
   x^2 & x \leq -1 \\
   -x^2 + 1 & -1 < x < 1 \\
   -1 + x^2 & x > 1 
\end{cases}$
   (a) What is the domain of $g(x)$.  
   (b) Is $g(x)$ even, odd, neither, or both?  
   (c) What is $h \circ g(x)$?  
   (d) State the domain of $h \circ g(x)$.  
   (e) Sketch $f(x)$.

3. (18 points; 3,3,4,8) Consider the following graph of a functional relationship $f(x)$ with secant line $PQ$:
   (a) What are the coordinates of point $P$?  
   (b) What are the coordinates of point $Q$?  
   (c) What is the slope of line $PQ$?  
   (d) Suppose $f(x) = \frac{1}{x}$, then find and simplify $\frac{f(a + h) - f(a)}{h}$.

4. (8 points) Solve for $x$:
   \[ \left[ \sin x \cdot \sqrt{x^2 + 9} - 3 \sin x \right] = 0. \]

5. (10 points) A truck can be rented from Basic Rental for $50 per day plus $0.20 per mile. Continental charges $20 per day plus $0.50 per mile to rent the same truck. What is the minimum number of miles that must be driven in a day to make the rental cost for Basic Rental a better deal than Continental’s?
6. (10 points) If the following solid has a volume of 21 cubic units, solve for $x$. All corners are 90° angles.

7. (19 points; 4,4,6,5) Answer the following:
   (a) Describe the shape, size, and location of the graph of $3x^2 + 3y^2 + 6x - 12y = 0$.
   (b) If a 45-45-90 triangle has a leg of length $\sqrt{2} + \sqrt{3}$, then how long is the hypotenuse?
   (c) What single trigonometry function is equivalent to $\tan \theta \sin \theta + \cos \theta$? Explain.
   (d) Solve for $P$ given that $T = \frac{A - P}{Pr}$. 

END of Exam