Please show **all** your work! Answers without supporting work will not be given credit. Write answers in spaces provided. You have 1 hour and 50 minutes to complete this exam.

Nombre:_____ Curso: _____ Fecha: _____

1. Complete la siguiente tabla escribiendo $\in$ o $\notin$

Número	2	-3π	-4.5	$-2.\overline{3}$	$\sqrt{49}$
Natural	$\in$		$\notin$		
Entero					
Racional					
Irracional					
Real					

a) $\lim\limits_{x\to 3} \dfrac{\sqrt{x+1}-2}{x-3}$

Answer:_____

b) $\lim\limits_{x\to 0} \dfrac{\sin(4x)}{8x}$

Answer:_____

2. Use the ε-δ definition of limit to prove that

$$\lim_{x\to 2} x^2 - 3x + 2 = 0$$

3. If $h(x) = \sqrt{x^2 + 2} - 1$, find a **non-trivial** decomposition of h into f and g such that $h = f \circ g$.

$f(x) =$_____

$g(x) =$_____

4. Find the first two derivatives of the function $f(x) = x^2 \cos(x)$. Simplify your answers as much as possible. Show all your work.

$f'(x) =$_____

$f''(x) =$_____

Cont.

5. Find the derivative of the function $f(x) = \int_{x^2}^{2} \frac{\cos(t)}{t}\, dt$.

Answer:_____

6. Set up, but do not evaluate, the integral for the volume of the solid obtained by rotating the area between the curves $y = x$ and $y = \sqrt{x}$ about the x-axis.

The End.