WRITE YOUR NAME:

MAC 2241 Homework 1
Due in class, Friday January 20th
You can use more paper if necessary, but please STAPLE

Question 1. If $f(x) = x^2$, find and simplify each of the following.

- $f(7)$
- $f(-7)$
- $f(7.02)$
- $f(7+h)$
- $f(7)+h$

- $f(7) = 7^2 = 49$
- $f(-7) = (-7)^2 = 49$
- $f(7.02) = (7.02)^2 = 49.2804$
- $f(7+h) = (7+h)^2 = (7+h)(7+h)$
  $= 49 + 14h + h^2$
- $f(7)+h = 7^2 + h = 49 + h$

$$\begin{array}{r} 702 \\ \times\ 702 \\ \hline 1404 \\ 4914 \\ \hline 492804 \end{array}$$

Question 2. Expand and simplify each of the following.

- $(a-b)(a+b)$
- $(\sqrt{x+h}-\sqrt{x})(\sqrt{x+h}+\sqrt{x})$
- $\dfrac{\sqrt{x+h}-\sqrt{x}}{h}\cdot\dfrac{\sqrt{x+h}+\sqrt{x}}{\sqrt{x+h}+\sqrt{x}}$

- $(a-b)(a+b) = a^2 - b^2$
- $\left(\sqrt{x+h}\right)^2 - \left(\sqrt{x}\right)^2 = (x+h) - x$
  $= h$
- $\dfrac{\left(\sqrt{x+h}\right)^2 - \left(\sqrt{x}\right)^2}{h\left(\sqrt{x+h}+\sqrt{x}\right)} = \dfrac{(x+h)-x}{h\left(\sqrt{x+h}+\sqrt{x}\right)}$

$= \dfrac{h}{h\left(\sqrt{x+h}+\sqrt{x}\right)} = \dfrac{1}{\sqrt{x+h}+\sqrt{x}}$

Question 3. For each of the following functions, find the domain. (Hint: It might help to make a table of values.)

- $f(x) = \sqrt{x-7}$
- $g(x) = \sqrt{x} - 7$

Domain of f: $x - 7 \geq 0$

$x \geq 7$

Domain of g: $x \geq 0$