Instructions: Show all work. Give exact answers unless specifically asked to round.

1. For $f(x) = x - 6, g(x) = 5x^2$ find the following functions. State the domain of each.
   a. $f + g$

   $$X - 6 + 5x^2 = 5x^2 + X - 6$$

   b. fg

   $$(X - 6)5x^2 = 5x^3 - 30x^2$$

   c. $f \circ g$

   $$5x^2 - 6$$

2. Determine if $f(x) = 4x + 9$, and $g(x) = \frac{x-9}{4}$ are inverses by checking $f(g(x)) = x$, and $g(f(x)) = x$. Graph both functions on the same graph to confirm symmetry across the line $y = x$.

   $$f(g(x)) = 4\left(\frac{x-9}{4}\right) + 9 = X - 9 + 9 = X$$

   $$g(f(x)) = \frac{4x + 9 - 9}{4} = \frac{4x}{4} = X$$