Composition of Functions

Consider the functions defined by the following ordered pairs:

$$f := \{(1,2),(2,3),(3,1)\}, g := \{(1,3),(2,2),(3,1)\}$$

1. Find the ordered pairs for the function $f \circ g$

   For example, $f \circ g(1) = f(g(1)) = f(3) = 1$ hence the first ordered pair is $(1,1)$
   $f \circ g := \{(1,1),(2,\ ),(3,\ )\}$

2. Find the ordered pairs for the function $g \circ f$
   $g \circ f := \{(1,\ ),(2,\ ),(3,\ )\}$

Consider the functions defined by the following ordered pairs:

$$F := \{(1,2),(2,3),(3,4),(4,5)\}, G := \{(0,4),(1,3),(2,0),(3,1)\}$$

1. What is the domain of F?
2. What is the range of F?
3. What is the domain of G?
4. What is the range of G?
5. What is the domain of $G \circ F$?
6. What is the domain of $F \circ G$?
7. Find the ordered pairs for the function $G \circ F$
8. Find the ordered pairs for the funciton $F \circ G$

Let $f(x) = x - 2, g(x) = x^2 + x$, both with domain all real numbers.

1. Find $f(5)$
2. Find $g \circ f(5) = g(f(5))$
3. Find $f(\pi)$
4. Find $g \circ f(\pi)$
5. Find $g \circ f(x)$
6. Find $f \circ g(x)$

Let $F(x) = \sqrt{1-x}, x \leq 1, G(x) = x^2 - 3$ with domain all real numbers.

1. What is the domain of $G \circ F$?

2. What is the domain of $F \circ G$?

3. Find $F(-3)$

4. Find $G \circ F(-3)$

5. What is $G \circ F(x)$

6. Explain why $G \circ F(5)$ is not -7. Hint: look at your answer to question 1.

7. Find $G(-1)$

8. Find $F \circ G(-1)$

9. Find $F \circ G(x)$ Be sure to include the domain in your definition.