pp. 393, Exercise Set 7.1

42. The property is true.

    Proof: Suppose $y \in F(A \cap B)$. *[We must show that $y \in F(A) \cap F(B)$.]* By definition of image of a set, there exists an element x in $A \cap B$ such that $y = F(x)$. By definition of intersection, x is in A and x is in B., and so, by definition of image of an element, $F(x) \in F(A)$ and $F(x) \in F(B)$. Thus, by substitution, $y \in F(A)$ and $y \in F(B)$. It follows, by definition of intersection, that $y \in F(A) \cap F(B)$ *[as was to be shown]*.

44. The property is false.

    Counterexample: Let $X = \{1, 2, 3\}$, $Y = \{a, b\}$, $A = \{1, 2\}$, $B = \{3\}$, and let $F(1) = F(3) = a$ and $F(2) = b$.

    Then $F(A) = \{a, b\}$, $F(B) = \{a\}$, $F(A - B) = F(\{1, 2\}) = \{a, b\}$, and

    $F(A) - F(B) = \{a, b\} - \{a\} = \{b\}$.

    So $F(A - B) \neq F(A) - F(B)$.