1. $f(x) : \mathbb{R} \to \mathbb{R}$ is continuous at x_0 if

   a) $\exists \epsilon > 0, s.t. \forall \delta > 0$ and $\forall x, |x - x_0| < \delta \Rightarrow |f(x) - f(x_0)| < \epsilon$
   b) $\forall \epsilon > 0, \exists \delta > 0$ s.t. $\forall x, |x - x_0| < \delta \Rightarrow |f(x) - f(x_0)| < \epsilon$
   c) $\forall \epsilon > 0, \exists \delta > 0$ s.t. $\forall x, d'(x, x_0) < \delta \Rightarrow d'(f(x), f(x_0)) < \epsilon$
   d) All of the above
   e) More than one answer from a, b and c holds, but not all three

2. Which of the following hold?

   a) $f(C_1 \cap C_2) = f(C_1) \cap f(C_2)$
   b) $f(C_1 \cup C_2) = f(C_1) \cup f(C_2)$
   c) $f(C_1 \cap C_2) \subseteq f(C_1) \cap f(C_2)$
   d) Only a) and b)
   e) Only b) and c)
   f) Only a) and c)

3. Which of the following are open sets?

   a) An open interval in $\mathbb{R}$
   b) An open diamond in $\mathbb{R}^2$
   c) An open diamond in $\mathbb{R}^2_{\text{taxicab}}$
   d) Only a) and b)
   e) Only a) and c)
   f) All of the above: a), b) and c)

4. In a successful proof that $B_d(x, \epsilon)$ is open, if $y \in B_d(x, \epsilon)$, what δ can you take for $B_d(y, \delta)$ to be in $B_d(x, \epsilon)$?

   a) Take $\delta = \epsilon$
   b) Take $\delta = \epsilon - d(x, y)$
   c) Take $\delta = d(x, y) - \epsilon$
   d) Any of the above are possible
   e) It is not possible to choose a δ successfully because the set is not open

5. What sets are open in the discrete metric on X?

   a) No sets are open
   b) Only circles of radius 1 are open
   c) Any subset of X is open
   d) Other