Assignment 3, Discrete Math
Covers sections 2.3, 2.4, 3.1, 3.2

1. 2.3 #3(b),(c)
2. 2.3 #5(b),(d)
3. 2.3 #7
4. 2.3 #11(a),(b)
5. 2.4 #4
6. 2.4 #11
7. 2.4 #18(a), (e)
8. 3.1 #28(b)-(c)
9. 3.2 #2
10. 3.2 #24
11. Define a relation on $\mathbb{R}^2 - \{(0,0)\}$ by $(a,b)\ R\ (x,y) \iff ay = bx$.
    Prove R is an equivalence relation, and graph $\overline{(-4,5)}$.
12. True or false. If true, prove it. If false, provide a counterexample.
    (a) If A and B are sets, then $\mathcal{P}(A \cup B) = \mathcal{P}(A) \cup \mathcal{P}(B)$.
    (b) If A and B are sets and $\mathcal{P}(A) \cap \mathcal{P}(B) \neq \emptyset$, then $A \cap B \neq \emptyset$.
13. Let $f : \mathbb{R} \to \mathbb{R}$ be a function and $a \in \mathbb{R}$.
    We say that f is continuous at a provided that for every $\varepsilon > 0$, there is a $\delta > 0$ so that
    $$|x - a| < \delta \implies |f(x) - f(a)| < \varepsilon.$$
    Negate the definition of continuity, and use it to show that the function defined by $f(x) = 0$ if $x < 0$ and $f(x) = 1$ if $x \geq 0$ is not continuous at $a = 0$.