NAME:
This quiz contains 5 problems worth 30 points. You may not use books, notes, or a calculator. You have 30 minutes to take the quiz.

1. (6 points) Let $X=\{a, b, c\}, Y=\{c, d, e, f\}, Z=\{a, d, e\}$, and let the universe $U=$ $\{a, b, c, d, e, f, g\}$.
(a) Find $X \cap(Y \cup Z)$.
(b) Find $(\overline{X \cup Y}) \cup Z$.
(c) Is $X \subseteq(Y \cup Z)$ ? Explain your answer.
2. (3 points) Let $A=\{0,1,2\}$ and $B=\{2,4\}$. List the elements in the set $A \times B$.
3. (6 points) Let $X=\{a, b, c\}$.
(a) List all subsets of $X$.
(b) List all partitions of $X$.
4. (12 points) Use $A=\{\mathbb{Z},\{\sqrt{2}, \sqrt{3}, \sqrt{5}\}, \pi, \sqrt{2}\}$ to answer questions (a) -(f) below.
(a) Find the cardinality of $A$.
(b) Is $\sqrt{2} \in A$ ? Explain.
(c) Is $\sqrt{5} \in A$ ? Explain.
(d) Is $\sqrt{2} \subseteq A$ ? Explain.
(e) Is $\{\sqrt{2}\} \subseteq A$ ? Explain.
(f) Is $\{\sqrt{2}, \sqrt{3}\} \subseteq A$ ? Explain.
5. (3 points) A survey of 100 children found that 3 had visited Anchorage, Juneau, and Seward, 4 had visited Anchorage and Juneau, 13 had visited Anchorage and Seward, 3 had visited Seward and Juneau, 44 had visited Anchorage,
23 had visited Seward, and
12 had visited Juneau.
How many of the 100 children had visited none of the three towns? (Show your work to receive partial credit. A Venn diagram might be a good idea.)
