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<th>Problem</th>
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Show all work.

1. Find the domain of \( f(x) = \sqrt{2 - x} \), and graph this function. (8 points)

2. (15 points, 5 each)
   a) Find the equation of the line through the points \((2, -7)\) and \((-4, 5)\).
   
   b) Find the equation of the line through \((3, 2)\) and parallel to the line \(3x = 2y + 3\).
   
   c) Find where the lines \(3x - 4y = 8\) intercepts the \(x\)-axis.
3. Here $\sim p$ is “not $p$”. 
(12 points, 4 each) 
   a) Make a truth table for $q \rightarrow (\sim p \lor q)$.

   b) Show whether or not $q \rightarrow (\sim p \lor q)$ in part a) is equivalent to $q \land \sim p$.

   c) Show $\sim q \rightarrow \sim p$ is equivalent to $p \rightarrow q$.

4. If $A = \{1, 3, 5, 7\}, \ B = \{1, 2, 3, 4\}$, with universe $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$, find 
(12 points, 3 each)
   a) $A \cup B =$

   b) $A \cap B' =$

   c) $(A' \cup B)' =$

   d) $A' \cap B' =$
5. Out of 100 warthogs, 57 like McDonalds, 38 like Burger King, and 13 hate both of them. How many warthogs like both of them. Make a Venn Diagram. (8 points)

6. If \( n(A') = 17 \), \( n(B \cap A') = 8 \), \( n(B') = 15 \), \( n(A \cup B) = 21 \), fill in a Venn Diagram and find a) \( n(A) \) and b) \( n(U) \). (8 points)

7. For 5 digit zip codes, find
(16 points: a),b) 3 points, c),d) 5 points)
    a) The number of zip codes with no 2’s.

    b) The number of zip codes with all digits different

    c) The number of zip codes with three 7’s in them

    d) The number of zip codes with one 7 and one 6 in them
8. Two fair dice are tossed. Write down the sample space and find (16 points, 4 each)

a) \( P( \text{get 8} ) = \)

b) \( P( \text{get at least 8} ) = \)

c) \( P( \text{get at least 4 on each die} ) = \)

d) \( P( \text{get different numbers on the two die} ) = \)

9. In a classroom with 25 boys and 35 girls, what is the probability you pick 5 students which are all boys, if you pick randomly? (8 points)