Math 112 - Quiz 3
February 7, 2019

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Let M be the set of all current PSC math students, and let E be the set of all current PSC English students.

   (a) Describe, in words, an element of the set $M - E$.

   A CURRENT PSC MATH STUDENT WHO IS NOT AN ENGLISH STUDENT.

   (b) Describe, in words, an element of the set $E - M$.

   A CURRENT PSC ENGLISH STUDENT WHO IS NOT A MATH STUDENT.

   (c) Describe, in words, an element of the set $M \cap E$.

   A CURRENT PSC STUDENT TAKING BOTH MATH & ENGLISH.

2. (2 points) Let $A = \{\text{red}, \text{blue}\}$ and $B = \{\text{pen}, \text{marker}\}$. List the elements of the set $A \times B$.

   (red, pen), (red, marker),
   (blue, pen), (blue, marker)

   4 ELEMENTS IN ALL.

TAKE-HOME PORTION OF QUIZ 3. DUE TUESDAY.

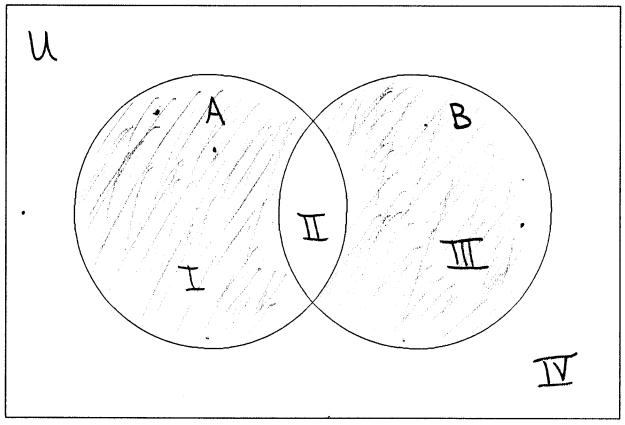
3. (2 points) In the two-set Venn diagram shown below, label the sets A and B. Then label the four distinct (disjoint) regions with Roman numerals. Identify and shade the regions that make up $(A \cap B') \cup (A' \cap B)$.

$A = \{I, II\}$

$B = \{II, III\}$

$A' = \{III, IV\}$

$B' = \{I, IV\}$



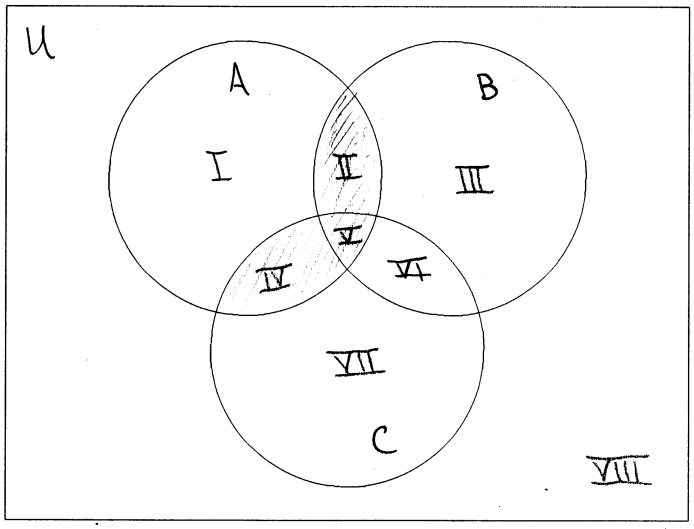
$A \cap B' = \{I\}$

$A' \cap B = \{III\}$

$(A \cap B') \cup (A' \cap B)$

$= \{I, III\}$

4. (2 points) In the three-set Venn diagram shown below, label the sets A, B, and C. Then label the distinct (disjoint) regions of the diagram with Roman numerals. Identify and shade the regions that make up $A \cap (B \cup C)$.



$A = \{I, II, IV, V\}$

$B = \{II, III, V, VI\}$

$C = \{IV, V, VI, VII\}$

$B \cup C = \{II, III, IV, V, VI, VII\}$

$A \cap (B \cup C) =$

$\{II, IV, V\}$

5. (1 point) Suppose A and B are sets with $n(A) = 10$, $n(B) = 12$, and $n(A \cup B) = 14$. Determine $n(A \cap B)$.

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$14 = 10 + 12 - \boxed{?}$$

$$14 = 22 - \boxed{?}$$

$$\Rightarrow \boxed{?} = 8$$