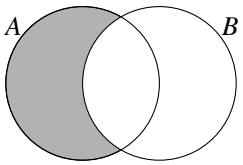
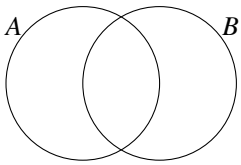
Practice Questions for Jan 17, 2019

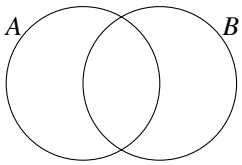
1. In part (i) below, we have shown two sets A and B, and the area for the set $A - B$ is shaded. Shade the areas for the sets indicated in (ii)-(iv).



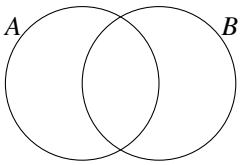
(i) The shaded area is for the set $A - B$



(ii) Shade the area for the set $B - A$

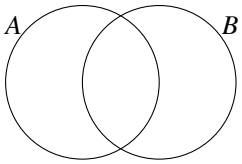


(iii) Shade the area for the set $A \cup B$



(iv) Shade the area for the set $A \cap B$

2. Shade the area below for elements (items) that belong to exactly one of the sets A and B. The set of such elements is denoted by $A \Delta B$ and is called the *symmetric difference* of A and B.



3. If $|A| = 10$, $|B| = 8$, and $|A \cap B| = 3$, then show the following:
   (a) $|A - B|$ = ...
   (b) $|B - A|$ = ...
   (c) $|A \Delta B|$ = ...

4. Complete the equations below for arbitrary sets A and B in terms of $|A|$ and $|B|$ (similar to the ones we did in the class for $|A \cup B|$).
   (a) max $|A \cap B|$ = ...
   (b) min $|A \cap B|$ = ...
   (c) $|A \Delta B| = |A| + |B| -$ .....

5. Which of the following are true?
   (a) $A \Delta B = (A - B) \cup (B - A)$
   (b) $A = B$ if and only if $A \Delta B = \emptyset$.
   (c) $A - B = A - (A \cap B)$.
   (d) The sets $A - B$ and $B - A$ are disjoint.