Math 22 (9:30am – 10:20am) Pop Quiz 8 Version M Wed Nov 30, 2011

SCORE: ____ / 6 POINTS

Three officers – a president, a treasurer and a secretary – are to be chosen from among 10 people: **SCORE:** ____/ **3 POINTS** Ann, Bob, Cat, Dan, Ed, Fay, Gio, Hal, Ira, Jon. Suppose that, for various reasons, Ann cannot be the president, and either Cat or Dan must be the secretary. How many ways can the officers be chosen ?

Step 1:	Choose either Cat or Dan for secretary	2 ways
Step 2:	Choose someone other than Ann and the person chosen in step 1 for president	8 ways
Step 3:	Choose someone other than the people chosen in steps 1 and 2 for treasurer	8 ways

Total ways = $2 \times 8 \times 8 = 128$ ways

Let R be an equivalence relation on the set A. Prove that the following statement is true. SCORE: ____/ 3 POINTS Provide proper justification for the statements in your proof. Do NOT use the lemmas and theorems that were proven in section 8.3.

For all $a, b, c \in A$, if $a \in [b]$ and $a \in [c]$, then $b \in [c]$.

PROOF: Let $a, b, c \in A$ such that $a \in [b]$ and $a \in [c]$.

So, aRb and aRc. By symmetry, bRa. By transitivity, bRc (since bRa and aRc). So, $b \in [c]$. Math 22 (9:30am – 10:20am) Pop Quiz 8 Version A Wed Nov 30, 2011

SCORE: ____ / 6 POINTS

Three officers – a president, a treasurer and a secretary – are to be chosen from among 9 people: **SCORE:** / **3 POINTS** Ann, Bob, Cat, Dan, Ed, Fay, Gio, Hal, Ira. Suppose that, for various reasons, Ann cannot be the president, and either Cat or Dan must be the secretary. How many ways can the officers be chosen ?

Step 1:	Choose either Cat or Dan for secretary	2 ways
Step 2:	Choose someone other than Ann and the person chosen in step 1 for president	7 ways
Step 3:	Choose someone other than the people chosen in steps 1 and 2 for treasurer	7 ways

Total ways = $2 \times 7 \times 7 = 98$ ways

Let R be an equivalence relation on the set A. Prove that the following statement is true. SCORE: ____/ 3 POINTS Provide proper justification for the statements in your proof. Do NOT use the lemmas and theorems that were proven in section 8.3.

For all $a, b, c \in A$, if $a \in [b]$ and $a \in [c]$, then $b \in [c]$.

PROOF: Let $a, b, c \in A$ such that $a \in [b]$ and $a \in [c]$.

So, aRb and aRc. By symmetry, bRa. By transitivity, bRc (since bRa and aRc). So, $b \in [c]$. Math 22 (9:30am – 10:20am) Pop Quiz 8 Version T Wed Nov 30, 2011

SCORE: / 6 POINTS

Let R be an equivalence relation on the set A. Prove that the following statement is true. SCORE: ____/ 3 POINTS Provide proper justification for the statements in your proof. Do NOT use the lemmas and theorems that were proven in section 8.3.

For all $a, b, c \in A$, if $a \in [b]$ and $a \in [c]$, then $b \in [c]$.

PROOF: Let $a, b, c \in A$ such that $a \in [b]$ and $a \in [c]$.

So, aRb and aRc. By symmetry, bRa. By transitivity, bRc (since bRa and aRc). So, $b \in [c]$.

Three officers – a president, a treasurer and a secretary – are to be chosen from among 8 people: **SCORE:** / **3 POINTS** Ann, Bob, Cat, Dan, Ed, Fay, Gio, Hal. Suppose that, for various reasons, Ann cannot be the president, and either Cat or Dan must be the secretary. How many ways can the officers be chosen ?

Step 1:	Choose either Cat or Dan for secretary	2 ways
Step 2:	Choose someone other than Ann and the person chosen in step 1 for president	6 ways
Step 3:	Choose someone other than the people chosen in steps 1 and 2 for treasurer	6 ways

Total ways = $2 \times 6 \times 6 = 72$ ways

Math 22 (9:30am – 10:20am) Pop Quiz 8 Version H Wed Nov 30, 2011

SCORE: ____ / 6 POINTS

Let R be an equivalence relation on the set A. Prove that the following statement is true. SCORE: ____/ 3 POINTS Provide proper justification for the statements in your proof. Do NOT use the lemmas and theorems that were proven in section 8.3.

For all $a, b, c \in A$, if $a \in [b]$ and $a \in [c]$, then $b \in [c]$.

PROOF: Let $a, b, c \in A$ such that $a \in [b]$ and $a \in [c]$.

So, aRb and aRc. By symmetry, bRa. By transitivity, bRc (since bRa and aRc). So, $b \in [c]$.

Three officers – a president, a treasurer and a secretary – are to be chosen from among 11 people: **SCORE:** ____/ **3 POINTS** Ann, Bob, Cat, Dan, Ed, Fay, Gio, Hal, Ira, Jon, Ken. Suppose that, for various reasons, Ann cannot be the president, and either Cat or Dan must be the secretary. How many ways can the officers be chosen ?

Step 1:	Choose either Cat or Dan for secretary	2 ways
Step 2:	Choose someone other than Ann and the person chosen in step 1 for president	9 ways
Step 3:	Choose someone other than the people chosen in steps 1 and 2 for treasurer	9 ways

Total ways = $2 \times 9 \times 9 = 162$ ways