Perms and Combs Practice QUIZ II SOLUTIONS

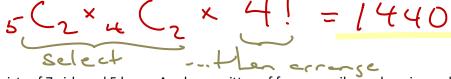
1. In a particular jurisdiction, license plates consist of any three letters, the first of which cannot be I or O, followed by any three non-repeating digits. Determine the number of possible license plates.

24×26×26× (0×9×8 = 11681280 Not Ion D No Repeting 2 2. Consider the letters in the word "REGRETTABLE". Determine the number of possible arrangements if: (a) There are no restrictions [1] Divide out identical 3(2(2)) Divide out identical = 1 663 200 (b) Each arrangement must start with an B 🔨 🖊 s Accept "REGRETALE" $\frac{10!}{3!2!2!} = 151200$ (c) Each arrangement must start with an E 4 Access "RELAETABLE" 10! = 45360 (d) Each arrangement must start and end with a T 2!2!2! = 45360Accesse "RELAEASLE" 7- 9! = 30240 0 = 123. In a particular family of 8 children, there are 5 boys and 3 girls. A photographer is hired to take a series of family pictures of the children only, where they're arranged in a row. How many ways can this be done if: a) There are no restrictions = 40 220 b) If the boys must be on the left side, and the girls on the right side, girls on the right: 5 000 51×31 = 720 BBGGGG = 61 × 71 c) If the girls must all be together Count WinlicsONE - RIBIN d) If two of the girls, Elizabeth and Katie, cannot be together TOTAL - Arrangements where Erk ARE = 4320 $= 8! - 7! 2! \Rightarrow = 30 240$ e) If the photograph consists of just three children – 2 boys and 1 girl. (The photographer selects the three, then arranges them in a row) 5C2×3C, ×3! **4.** NR The three → problems 1 The number of different arrangements using all the letters in the word MATHY The number of unique 5 player teams that can be selected from 8 boys and 9 girls 2 that can be solved using The number of line segments that can be drawn using the vertices of an 8-sided 3 (ⁿ) are <u>2</u>, <u>3</u>, <u>4</u>, and polygon that are marked on a circle. 2 The number of different way to choose 4 specialty donuts from a display of 6 different donuts at a coffee shop 5 The number of different ways to assign the job of chairperson, vice-chair, and 5. Algebraically determine the secretary for a committee from 6 people.



- 5. Consider the letters in the word SMILE and FROG. The consonants are S, M, L, F, R, and G.
 - (a) How many ways can any 2 letters be selected from the word SMILE? (That is, how many two-letter groups, not arrangements, are possible?) $5L_{2} = (0)$
 - (b) How many ways can any 2 letters be selected from the word SMILE and any 2 letters be selected from the word FROG?

- (c) How many ways can the letters in any four-letter word be arranged? (Assuming all letters are different) 4! = 24
- (d) How many different 4-letter arrangements are possible using any 2 letters from the word SMILE and any 2 letters from the word FROG?



- 6. A student council consists of 7 girls and 5 boys. A subcommittee of four council members is needed to coordinate a school dance. How many ways can this be done if:
 - (a) There are no restrictions

12C4 = 495

- (b) There must be exactly 2 boys and 2 girls
- (c) There must be exactly 2 boys and 2 girls, and the council president Claire (girl) must be on the subcommittee? New question: Select 2 boys, 1 c...

5

4

(d) If either Claire or the vice-president David (boy) must on the subcommittee. (Hint: Consider two different cases) Claire OevilANSfrom <math>kpart $c \rightarrow 60 + 4C_1 \times 2C_2 = 144$

 $5(2 \times 6) = 60$

(e) There must be at least one boy on the subcommittee.

1 Boy on 2 Boys on 3 Boys on 4 Boys

$$5C_1 \times 7C_2 + 5C_2 \times 7C_2 + 5C_3 \times 7C_1 + 5C_4$$

= 460 Short Wey: $12C_4 - 7C_4$ (No Boys)

BONUS: A pizzeria offers a \$9.99 special, where a medium pizza with up to five toppings can be ordered. (That is, a customer can order less toppings if they wish) Assuming double-toppings are not permitted, a plain cheese pizza counts as no toppings, and there are 12 toppings to choose from, determine the total number of orders possible. 1200 + 12(1 + 12(2 + 12(3 + 12(5

 $= 15 \times 6$