

Math 102**Exam 2: Additional Practice Problems**

1. Compute the value of each of the following:
 - (a) $0!$
 - (b) $5!$
 - (c) $P(12, 7)$
 - (d) $\frac{10!}{7!}$
 - (e) $C(10, 7)$
 - (f) $\frac{1000!}{997!}$
2. A local restaurant has 4 appetizers, 12 entrees, and 5 desserts. Find the number of possible meals that can be formed by choosing exactly one menu item of each type.
3. A company assigns billing codes to each of its clients consisting of two letters followed by three one-digit numbers. Find the number of possible billing codes if:
 - (a) Repetition is allowed.
 - (b) Repetition is **not** allowed.
4. A club has 5 male members and 7 female members.
 - (a) How many ways can a committee of 5 club members be chosen?
 - (b) How many ways can a committee of 5 be chosen if the committee is required to consist of 2 men and 3 women?
 - (c) How many ways can a committee of 5 be chosen if one member is designated as the head of the committee, and the rest of the committee is required to consist of 2 men and 2 women?
5. Suppose you go to the store and purchase a variety pack with 8 individually wrapped bags of chips, where each bag is of a different type. You plan to select one bag each day (Monday through Friday) to include as part of the lunch you take to work. How many different ways could the chips you bring to work for lunch that week be selected?
6. A bag contains 7 white chips, 3 red chips, and 2 blue chips. Suppose two chips are drawn from the bag.
 - (a) How many ways could you draw 2 red chips?
 - (b) How many ways could you draw 2 chips that are both the same color?
 - (c) How many ways could you draw two chips that are **not** red?
 - (d) How many ways could you draw **exactly one** blue chip?
7. For a standard deck of 52 cards, find the number of 5 card hands satisfying each description.
 - (a) All 5 of the cards are spades.
 - (b) Four of the cards are red and one of the cards is black.
 - (c) Three of the cards are hearts and two of the cards are clubs.
 - (d) There is an Ace, two 7s, and two face cards.
8.
 - (a) Use set notation to list all the elements of the set:
 $A = \{ x \mid x \text{ is an odd whole number less than } 21 \}$
 - (b) Use set-builder notation to describe the set $\{-3, -2, -1, 0, 1, 2, 3\}$
9. Given that $A = \{ x \mid x \text{ is a letter in the word } \textit{banana} \}$, $B = \{ x \mid x \text{ is a letter in the word } \textit{bandana} \}$, $C = \{ x \mid x \text{ is a letter in the word } \textit{band} \}$, and $D = \{ \emptyset \}$, indicate whether the following are True or False (you do NOT need to justify your answers)
 - (a) $\{a\} \in A$
 - (b) $d \in A$
 - (c) $\emptyset \subseteq A$
 - (d) $A \subseteq B$
 - (e) $B \subset C$
 - (f) $B = C$
 - (g) $D \subset B$
 - (h) $\emptyset \in D$

10. Let $U = \{ x \mid x \text{ is a positive integer less than } 12 \}$; $A = \{0, 2, 4, 6, 8\}$; $B = \{1, 2, 3, 4, 5\}$; $C = \{6, 7, 8, 9, 10\}$;
 $D = \{ x \mid x \text{ is an element of both } A \text{ and } C \}$
- (a) Write U in roster notation.
 - (b) Find $n(A)$ and $n(D)$.
 - (c) Which of the sets A , B , C and D are equivalent to each other?
 - (d) Which of the sets A , B , C and D are equal?
 - (e) Is A a subset of U ? Justify your answer.
11. (a) List all the subsets of the set $\{a, b, c\}$
- (b) How many subsets does the set $\{a, b, c, d, e\}$ have?
 - (c) Write out the first 6 rows of Pascal's Triangle
 - (d) Use Pascal's Triangle to find the number of 3 element subsets of $\{a, b, c, d, e\}$