Homework #5   Name: _____

If a question is wrong, or has no acceptable answer, do not mark any choice.
If a question has several correct answers, choose the most accurate/complete/informative one.
On a separate sheet, write a detailed justification of your choice.
You will be graded on the accuracy and precision of this justification only.
You will get 1 point for each correct answer and 0 points for missing or incorrect answers.
Your grade will be written on the back of this page.

1. The C++ language is:

    [-A-] finite
    [-B-] countably infinite
    [-C-] countable
    [-D-] uncountable

2. Let $\mathbb{E} = \{x \mid x \in \mathbb{N}$ and x is even$\}$.
    Which function over $\mathbb{E}$ proves that $\mathbb{E}$ is countable.

    [-A-] $f(x) = 2x$
    [-B-] $f(x) = x/2$
    [-C-] $f(x) = x$
    [-D-] All of the above

3. A countable union of countable sets is:

    [-A-] either finite or infinite
    [-B-] neither finite nor infinite
    [-C-] infinite
    [-D-] finite

4. Let $A = \{1, 2, 3\}$ and $B = \{1, 2\}$.
    Let $C = A \times B$.

    [-A-] $|C| = 6$
    [-B-] $|C| = 5$
    [-C-] $|C| = 4$
    [-D-] $|C| = 2$

5. The number of permutations of 3 elements out of a set of 7 elements is about:

    [-A-] 50
    [-B-] 100
    [-C-] 200
    [-D-] 400

6. The number of permutations of 3 colors, one of which is red, out of a set of 7 colors, one
    of which is red, is:

    [-A-] 45
    [-B-] 90
    [-C-] 180
    [-D-] 210

7. The number of r-combinations (size r) chosen from n distinct objects is:

[-A-] $r!$

[-B-] $\dfrac{n!}{r!}$

[-C-] $\dfrac{n!}{(n-r)!}$

[-D-] $\dfrac{n!}{r!\,(n-r)!}$

8. The number of ways to arrange the letters of the word "LALALA" is:

[-A-] 18

[-B-] 20

[-C-] 36

[-D-] 120

9. The number of different ways 4 people can ride a merry go round (arranged around a circle) is:

[-A-] 6

[-B-] 12

[-C-] 24

[-D-] 36

10. For all n and k:

[-A-] $\binom{n}{k} < \binom{n}{n-k}$

[-B-] $\binom{n}{k} = \binom{n}{n-k}$

[-C-] $\binom{n}{k} > \binom{n}{n-k}$

[-D-] None of the above

11. 10 choose 6 is:

[-A-] 45

[-B-] 90

[-C-] 180

[-D-] 210