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**Problem 1. (1 point)**

A girl owns 2 pairs of pants, 3 shirts, 5 ties, and 8 jackets. How many different outfits can the girl wear to school if each outfit must consist of one of each item?

There are \_\_\_\_\_ different outfits.

**Problem 2. (1 point)**

How many strings of 4 lower case English letters are possible? \_\_\_\_\_

How many strings of 4 lower case English letters are possible that have the letter "t" in them somewhere? Here strings may use the same letter more than once. (Hint: It might be easier to first count the strings that don't have a "t" in them.)

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**Problem 3. (1 point)**

A true-false test contains 11 questions. In how many different ways can the 11-question test be answered? (Give an exact answer.)

Your answer is : \_\_\_\_\_

**Problem 4. (1 point)**

A particular brand of shirt comes in 10 colors, has a male version and a female version, and comes in 4 sizes for each sex. How many different types of this shirt are made?

Your answer is: \_\_\_\_\_

**Problem 5. (1 point)**

A vendor sells ice cream from a cart on a sidewalk in downtown Flagstaff, Arizona. He offers 4 different flavors (vanilla, chocolate,...) served on 2 different cones. How many different single-scoop ice-cream cones can you buy from this vendor?

Your answer is : \_\_\_\_\_

**Problem 6. (1 point)**

Standard automobile license plates in a country display 2 numbers, followed by 2 letters, followed by 3 numbers. How many different standard plates are possible in this system? (Assume repetition of letters and numbers is allowed.)

Your answer is : \_\_\_\_\_

**Problem 7. (1 point)**

A company has 870 employees. Each employee is to be given an ID number that consists of one letter followed by 1 digits.

How many different ID numbers are possible?:

\_\_\_\_\_

Is it possible to give each employee a different ID number using this scheme?

Your answer is (input Yes or No): \_\_\_\_\_

\_\_\_\_\_

**Problem 8. (1 point)**

In how many ways can 8 students be seated in a row of 8 chairs if Jason insists on sitting in the first chair?

Your answer is : \_\_\_\_\_

\_\_\_\_\_

**Problem 9. (1 point)**

A bit is a 0 or a 1. A bit string of length 6 is a sequence of 6 digits, all of which are either 0 and 1.

(a) How many bit strings of length 6 are there?

\_\_\_\_\_

(b) How many bit strings of length 6 or less are there? (Count the empty string of length zero also.)

\_\_\_\_\_

\_\_\_\_\_

**Problem 10. (1 point)**

How many strings of 4 lower case English letters are there that have the letter x in them somewhere? Here strings may use the same letter more than once. (Hint: It might be easier to first count the strings that don't have an x in them.)

Your answer is: \_\_\_\_\_

\_\_\_\_\_

**Problem 11. (1 point)**

4 dice of different colors are rolled, and the number coming up on each die is recorded. How many different outcomes are possible?

Your answer is : \_\_\_\_\_

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**Problem 12. (1 point)**

Determine the size of the sample space that corresponds to the experiment of tossing a coin the following number of times:

(a) 4 times

Answer: \_\_\_\_\_

(b) 7 times

Answer: \_\_\_\_\_

(c)  $n$  times

Answer: \_\_\_\_\_

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**Problem 13. (1 point)**

Suppose  $N(A) = 30$ ,  $N(B) = 20$ , and  $N(A \cap B) = 6$ . How many elements are in  $A \cup B$ ? \_\_\_\_\_

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**Problem 14. (1 point)**

The sets  $A$  and  $B$  are such that  $|A| = 8$ ,  $|B| = 2$ , and  $|A \cap B| = 0$ .

Then  $|A \cup B|$  is \_\_\_\_\_, and  $|A \setminus B|$  is \_\_\_\_\_.

The sets  $C$  and  $D$  are such that  $|C| = 10$ ,  $|D| = 2$ , and  $|C \cap D| = 1$ .

Then  $|C \cup D|$  is \_\_\_\_\_, and  $|C \setminus D|$  is \_\_\_\_\_.

The sets  $E$  and  $F$  are such that  $|E| = 18$ ,  $|F| = 11$ , and  $|E \cup F| = 25$ .

Then  $|E \cap F|$  is \_\_\_\_\_, and  $|E \setminus F|$  is \_\_\_\_\_.

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**Problem 15. (1 point)**

One of Shakespeare's sonnets has a verb in 14 of its 17 lines, an adjective in 12 lines, and both in 9 lines.

How many lines have a verb but no adjective? \_\_\_\_\_

How many lines have an adjective but no verb? \_\_\_\_\_

How many have neither an adjective nor a verb? \_\_\_\_\_

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**Problem 16. (1 point)**

Solve the following two "union" type questions:

(a) How many bit strings of length 10 either begin with 3 0s or end with 2 1s? (inclusive or)

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(b) Every student in a discrete math class is either a computer science or a mathematics major or is a joint major in these two subjects. How many students are in the class if there are 32 computer science majors (including joint majors), 24 math majors (including joint majors) and 9 joint majors?

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**Problem 17. (1 point)**

A company conducted a marketing survey of college students and found that 157 own a bicycle and 70 owned a car. If 24 of those surveyed own both a car and a bicycle, how many interviewed have a car or a bicycle?

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