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Problem 1

Michelle chooses one square and one circular disk from the squares and disks shown below.

How many different ways can Michelle choose one square and one disk?

- A. 6
- B. 2
- C. 8
- D. 4

Solution:

Solution

First Michelle can choose one square (4 ways) then she can choose one disk (2 ways) so she can choose a square and a disk in $4 \times 2 = 8$ ways.

Correct Answers:

- C

+6pc-1pc

Problem 2

At a restaurant there are 5 kinds of pasta and 2 ttypes of sauce.
How many different ways can a customer order one kind of pasta and one type of sauce?

- A. 20
- B. 7
- C. 5
- D. 10

Solution:

Solution

The customer may first choose his pasta in 5 ways. For each of these choices there are 2 sauce choices so the customer has $5 \times 2 = 10$ ways.

Correct Answers:

- D

+6pc-1pc

Problem 3

A *ternary string* is a string made up of 0's, 1's. and 2's. How many ternary strings of length 7 are there?

Number of 7-digit ternary strings = _____

Solution:

SOLUTION

The number of 7-digit ternary strings is 3^7, because you have 3 choices to make for each of the 7 digits.

Correct Answers:

- 3^7

+6pc-1pc

Problem 4

If a girl has 8 skirts, 5 blouses, and 9 pairs of shoes, how many different skirt-blouse-shoe outfits does she have?

Answer: _____

Correct Answers:

- $8 \cdot 5 \cdot 9$

+6pc-1pc

Problem 5

In how many ways can a true-false test with 20 questions be answered?

Answer: _____

Correct Answers:

- 2^{20}

+6pc-1pc

Problem 6

In how many ways can 5 letters be dropped in 3 mailboxes?

Answer: _____

Correct Answers:

- 3^5

+6pc-1pc

Problem 7

A pollster classifies voters according to sex (male and female), party affiliation (Democrat, Republican, and Independent), and family income (below \$15,000, \$15,001 − \$30,000, \$30,001 − \$45,000, \$45,001 − \$60,000, \$60,001 − \$75,000, and above \$75,001). How many combined classifications does the pollster use?

Answer: _____

Correct Answers:

- 36

+6pc-1pc

Problem 8

This problem is taken from the delightful book "Problems for Mathematicians, Young and Old" by Paul R. Halmos.

Suppose that 893 tennis players want to play an elimination tournament. That means: they pair up, at random, for each round; if the number of players before the round begins is odd, one of them, chosen at random, sits out that round. The winners of each round, and the odd one who sat it out (if there was an odd one), play in the next round, till, finally, there is only one winner, the champion. What is the total number of matches to be played altogether, in all the rounds of the tournament?

Your answer: _____.

Hint: This is much simpler than you think. When you see the answer you will say "of course".

Solution:

Solution: Each match eliminates one person. There are 893 players, one will be left after we eliminate $893 - 1 = 892$ players in 892 matches.

Correct Answers:

- 892

+6pc-1pc

Problem 9

A fair 6-sided die is rolled 4 times and the resulting sequence of 4 numbers is recorded.

How many different sequences are possible? _____

How many different sequences consist entirely of even numbers? _____

How many different sequences are possible if the first, third, and fourth numbers must be the same? _____

Correct Answers:

- 1296
- 81
- 36

+6pc-1pc

Problem 10

A standard Missouri state license plate consists of a sequence of two letters, one digit, one letter, and one digit. How many such license plates can be made?

_____

A standard New York state license plate consists of a sequence of three letters followed by three digits. How many such license plates can be made?

_____

Correct Answers:

- 1.7576×10^6
- 1.7576×10^7

+6pc-1pc
Problem 11

The CEO of a company has a table in his office which can seat 3 employees. How many seating arrangements are possible if 3 out the 11 employees sit at the table?

_____
Correct Answers:

- 990

+6pc-1pc
Problem 12

A park bench can seat 4 people. How many seating arrangements are possible if 4 people out of a group of 13 want to sit on the park bench?

_____
Correct Answers:

- 17160

+6pc-1pc
Problem 13

How many ways can a team of 28 hockey players choose a captain and two alternate captains?

_____
Correct Answers:

- 9828