1) How many different arrangements of the word CABBAGES are possible?

a. 3,780
b. 5,040
c. 5,670
d. 7,560
e. 10,080

How many arrangements of the word CABBAGES:

2) ... keep repeated letters together?

a. 720
b. 840
c. 960
d. 1,020
e. 1,090

3) ... have NO identical letters adjacent?

a. 3,040
b. 3,780
c. 5,040
d. 5,760
e. 7,560

A box contains 8 balls, of which 3 are identical and the other 5 are unique. 3 balls are chosen from the box randomly. How many unique selections:

4) ... are possible?

a. 24
b. 26
c. 28
d. 29
e. 30

5) ... contain at least 1 of the identical balls?

a. 26
b. 16
c. 20
d. 24
e. 22

A program randomly outputs a two-digit code using 1 to 9, with repeats allowed. How many:

6) ... unique codes can be formed?

a. 81
b. 72
c. 63
d. 56
e. 45

7) ... codes have a second digit larger than the first?

a. 18
b. 32
c. 34
d. 36
e. 42

8) ... have one odd and one even digit?

a. 30
b. 32
c. 35
d. 38
e. 40

The program now outputs a three-letter code using letters from A to Z. How many unique codes:

9) ... have exactly one vowel (a vowel being A, E, I, O, U) and no repeated letters?

a. 11,800
b. 12,200
c. 12,600
d. 13,200
e. 13,800

10) ... have only vowels (with repeats allowed)?

a. 120
b. 125
c. 132
d. 140
e. 144

A soccer team has 1 goalkeeper, 4 defenders, 2 midfielders, and 4 forwards. A soccer club has 3 goalkeepers, 8 defenders, 5 midfielders, and 6 forwards on its roster. How many ways are there to:

11) ... choose a team from the club's members?

a. 33,100
b. 32,750
c. 31,500
d. 31,200
e. 30,350

12) ... choose a team that includes exactly 1 of a pair of twins (1 midfielder, 1 forward)?

a. 17,600
b. 17,200
c. 16,800
d. 16,400
e. 16,200

13) ... randomly select 3 of the chosen team members for random pre-game testing?

a. 165
b. 170
c. 175
d. 180
e. 185

14) In how many ways can 2 dogs and 1 cat be selected from a group of 7 dogs and 6 cats?

a. 102
b. 108
c. 122
d. 126
e. 132

15) Out of 12 books, 6 are chosen and ordered on a shelf. How many unique arrangements are possible?

a. 44,352
b. 133,056
c. 177,408
d. 443,520
e. 665,280

16) How many unique 3-digit numbers can be formed using the digits 1, 2, 2, 4, 5, 6?

a. 72
b. 78
c. 81
d. 84
e. 90

17) Find n if $nC_2 = 55$.

a. 10
b. 11
c. 12
d. 13
e. 14

18) Simplify $\frac{1}{n!} - \frac{1}{n+1\ !}$

a. $\frac{1}{n\ \ n+1\ !}$
b. $\frac{n+1}{n!}$
c. $\frac{n}{n!}$
d. $\frac{n}{n+1\ !}$
e. $n!$

19) Six dongles are randomly distributed to 2 students. In how many ways can it be done if each student must have at least 1 dongle?

a. 62
b. 16
c. 32
d. 30
e. 64

20) From a party of 12 men and 8 women, a group of 5 men and 3 women is chosen. How many unique groups can be selected?

a. 55,440
b. 44,352
c. 20,790
d. 13,860
e. 6,930

In how many ways can the integers 1, 2, 3, 4, 5, 6, 7, 8 be placed in a circle if:

21) ... all the even numbers are together?

a. 625
b. 576
c. 501
d. 432
e. 324

22) ... the odd and even numbers alternate?

a. 99
b. 102
c. 104
d. 124
e. 144

23) ... the integers 1 and 7 are adjacent?

a. 840
b. 940
c. 1,040
d. 1,240
e. 1,440

24) How many three-digit numbers have NO repeated digits?

a. 580
b. 600
c. 648
d. 672
e. 690

25) Of the arrangements of the digits {1, 2, 3, 4, 5, 7}, what proportion are odd numbers?

a. $\frac{1}{3}$
b. $\frac{4}{5}$
c. $\frac{1}{2}$
d. $\frac{2}{3}$
e. $\frac{2}{5}$

26) Evaluate $\binom{12}{7} \div \binom{4}{2}$.

a. 132
b. 81
c. 42
d. 26
e. 12

A bag has 15 unique pens. 6 have red ink, 5 blue, and 4 black. How many ways are there to choose

27) ... 3 pens of one color?

a. 33
b. 34
c. 36
d. 37
e. 39

28) ... 1 pen of each color?

a. 108
b. 112
c. 116
d. 120
e. 124

29) ... 10 pens in 2 colors?

a. 10
b. 11
c. 12
d. 14
e. 16

30) A die is thrown twice. How many ways are there for the outcomes to sum to at most 4?

a. 11
b. 9
c. 8
d. 6
e. 5

31) Find n if $\binom{n}{2} = 36$.

a. 9
b. 11
c. 12
d. 14
e. 15

32) Six identical coins are lined up on a table. Find how many patterns are possible if there are 5 tails and 1 head.

a. 2
b. 4
c. 5
d. 6
e. 8

Consider the word ELEVATED.

33) How many unique arrangements of its letters exist?

a. 8,840
b. 6,720
c. 5,480
d. 4,720
e. 3,630

34) In how many of the arrangements are T and D not adjacent?

a. 3,960
b. 4,230
c. 4,720
d. 4,800
e. 5,040

35) How many of the arrangements have alternating consonants and vowels?

a. 192
b. 194
c. 200
d. 208
e. 212