1/ Given,

2 Versions, Iphone 14 promax & Iphon 14 prob has 4 different colors so,

$$2 \times 4 = 8$$

and, 2 version, Iphone 14 plus & Iphone 14 has 5 different colors so,

$$2 \times 5 = 10$$

Therefore, total types of phone available this year are, $10 + 8 = 18$ Ans

2/(a) There are 4 possible answers for each question,

Applying product rule, $4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4$

$$= 4^{10}$$

$$= 1048576 \text{ ways}$$

Ans

(b) If we take blank as an option there is 5 ways.

Applying product rule, $5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$

$$= 5^{10}$$

$$= 9765625$$

Ans

4. (a) Given, the word is "addresses"

here, d repeated 2 times

e " 2 "

s " 3 "

So, Different 9 letter words can be formed in, $\frac{9!}{3!\,2!\,2!} = 15119$ ways

= 15119 ways Ans

(b) Different 5-letter words can be formed in, $\frac{9\times8\times7\times6\times5}{2!\times2!\times3!} = 630$ ways

Ans

(c) Given, the word has,

3 vowels (a, e, e)

6 consonants (d, d, r, s, s, s)

we can organize them together with consonant & vowels separately,

$= \frac{6!}{2!\,3!} \times \frac{3!}{2!}$

= 180 ways

Ans

(d) Given, the word has 6 consonants & 3 vowels.

Now, words can be formed with the 2 consonant placed after consonants and vowels ~~grouped together separately~~,

$$\frac{6\times5\times3\times3\times4\times2\times2\times1\times1}{3!\times2!\times2!}$$

$= 180$ ways Ans

5/ (a) The number of triangle can be made by 9 sided polygon,

$$^9C_3 = 84 \text{ way}.$$

Ans

(b) If, E, F, G, H are family we are leftout with other 4. Assuming, family as a member we get total 5 members. And those 4 family members can also be arranged. Lastly we get,

$$5! \times 4! = 2880 \text{ arrangements}$$

Ans

(c) If, family stays together they make 4! combinations. And with other left out 4 members the family can stay at the end of the line in,

$$4! \times 4! = 576 \text{ arrangements.}$$

Ans

(d) Without any restriction we can form combination for 9 in (n-1)! ways

$$= 8!$$

Frome (b) we got,

arrangements with 4 family members staying together in, $8! - 2880$

$$= 40320 - 2880$$

$$= 37440 \text{ permutations}$$

Ans

--|--|--|--|--

(e) If, no two members of the family are together, 2 member are in a group we can assume other 4 as boundry between the members

So, there are total 5 possitions.

Therefore, $5P_4 \times 4! = 2880$ ways

Ans

(f) Adult = 5

Minors = 3

∴ Combination of 3 adults & 2 minors can be,

$5C_3 \times {}^3C_2$

$= 30$

Ans

(g) from (f) we got,

~~grou~~ Combinations who are allowed for the ride which is 30

If A & B can not be together,

$$3c_2 \times 2c_2 \times 3c_1 = 9$$

Therefor, withot A & B staying together we get, $30 - 9 = 21$ combinations

Ans

6/ Given, $\{20, 30, 40, 50, 60, 70, 80\}$

the pairs that gives 100 are,

$\{(20, 80), (30, 70), (40, 60)\}$

Worst case will be if he get two number of pairs that does not goes upto 100. In that case if he select 3 numbers it would add upto 100. $\{20, 30, 40, 50\}$

Ans: 4

7/ We have three parties

an 500 500 people

If we deride 500500 to 3 people they will get equal votes which is,

$$\frac{500500}{3} = 166833 \text{ votes}$$

And to win any of the party have to get at least 166833 +1 votes

$= 166834$ votes

Ans

8/ Given, 7 time periods (Pigeon Holes)

597 classes (pigeon)

So, $\frac{597}{7}$

$= 86$ classes

9/ Given, district = 64 (Pigeon Hole)

student = 200 (pigeon)

if 200 student come from the same district,

then, $64 \times 199 + 1 = 12737$

Ans